SAFEPATH®4 Telephone Zone Controller

SP4-TZC P/N 109921

Installation, Testing,

Operation and Maintenance

Manual

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Chapter 1 Application Information

1.1 Description

The SP4 Telephone Zone Controller (SP4-TZC) controls the zone paging capability of the ***SAFEPATH®4*** **Multi-Function Facility Communications System.** It is used in conjunction with the SP40/2 and the SP4-APS (SP4 Addressable Paging Splitter) module. Audio Boosters SPB-80/4, SPB-160, and SPB-320 can be used in conjunction with the SP40/2. Each audio booster can use additional SP4-APS modules, increasing the number of possible paging zones.

The Addressable Paging Splitter (SP4-APS) in conjunction with the SP4-TZC allows the End User to make audio zone specific telephone pages and/or have audio zone specific Background Music (BGM) on a Wheelock ***SAFEPATH®4*** **Multi-Function Facility Communications System.** This can occur as long as system is not broadcasting a pre-recorded message or when the live microphone is in use. The selective paging and BGM functions are controlled by the SP4-TZC (Telephone Zone Controller) over an RS-485 based digital control network. It also provides a means for expanding one supervised audio output zone to four CLASS "B" or two CLASS "A" supervised zones. The maximum number of CLASS "B" zones in a system is 68. The maximum number of CLASS "A" zones in a system is 34.

The SP4-TZC can be used with or without the SP4 Telzone Programmer software. The features available without using the software include the use of Individual Zones and Fixed Zone Groups, and Background Music on all zones. When using the SP4 Telzone Programmer software, additional features include Logical Zone Groups and editing Individual Zones for Background Music.

An Individual Zone is one of the separate outputs from an SP4-APS splitter. The SP4-APS splitter can produce either 2 CLASS "A" or the 4 CLASS "B" zones.

A Fixed Zone Group consists of the 2 CLASS "A" or the 4 CLASS "B" zones on each SP4-APS splitter. For example, if the first SP4-APS splitter is used to cover the zones in the warehouse area, the Fixed Zone Group for that area can be paged by keying the two digit code "71" on the paging phone. The zone codes for Fixed Zone Groups are 71 through 87 with each zone code matching the order of splitters.

When used with the SP4 Telzone Programmer software, the SP4 Telephone Zone Controller (SP4-TZC) in conjunction with the SP4-APS splitter is capable of programming up to 9 Logical Zone Groups for audio paging. A Logical Zone Group consists of 1 to 5 Individual Zones and/or Fixed Zone Groups. It can also program any Individual Zone for Background Music. The two digit zone code for the Logical Zone Groups are "91" through "99".

Paging an Individual Zone, a Fixed Zone Group, or a Logical Zone Group is accomplished using a touch tone phone connected to a page port or a touch tone stand alone phone. The paging telephone is connected to the SP4-TZC allowing it to key the zone codes each consisting of two-digit DTMF tones. See Table 1 on Page 6 for the dialing scheme. Any Individual Zone or Fixed Zone Group that is not known by the system will result in a no page condition and the SP4-TZC will start the paging process over.

Table 1
Dialing Scheme

Dialing Scheme	
Zone Code	Zones
00	All Call
01 - 68	Individual Zones
71 - 87	Fixed Zone Groups
91 - 99	Logical Zone Groups

Note: Zone Code is the splitter zone DTMF tone.

All splitters must use the same CLASS of wiring (CLASS "A" or "B") for the audio output zones. See the SP4-APS Installation Instructions (P84577) for proper wiring of these zones.

Individual Zone and Fixed Zone Group sequence numbers are controlled by the placement of the splitters in the RS485 digital communication circuit. The first splitter connected to the RS485 digital control port on the SP4-TZC will be assigned the first zone codes (Individual Zone codes of "01" and "02" for CLASS "A", Individual Zone codes of "01" through "04" for CLASS "B", and a Fixed Zone Group code of "71"). Using the previous example where the first splitter covers the warehouse area, let's add a second splitter covering the front office area. If the paging zones are set for CLASS "A" then the warehouse will have Individual Zone codes of "01" and "02". The front office area Individual Zone codes will be "03" and "04". The Fixed Zone Group code for the warehouse will be "71", and the front office Fixed Zone Group code will be "72"

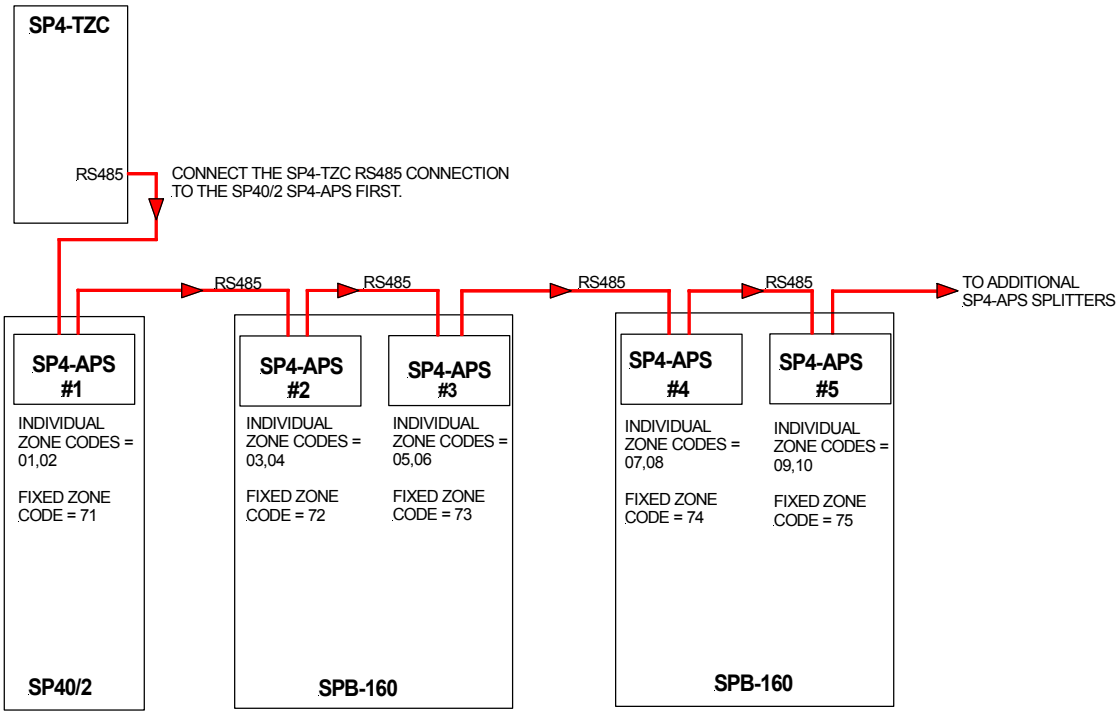


Figure 1
RS485 Communications Path from SP4-TZC to Last CLASS "A" Splitter

Figure 1 shows the path of the RS485 digital control loop and the sequence of the splitters in that loop. The SP40/2 splitter is always the first splitter connected to the RS485 loop. Notice on Figure 1 that the individual and Fixed Zone Group codes are listed for a CLASS "A" splitter configuration. The SPB-160 is used as an example of an audio booster.

If the paging zones are set for CLASS “B” then the warehouse Individual Zone codes will be “01” through “04”, and the front office Individual Zone codes will be “05” through “08”. The Fixed Zone Group code for the warehouse will still be “71”, and the front office Fixed Zone Group code will still be “72”. See Figure 2 for a CLASS “B” example.

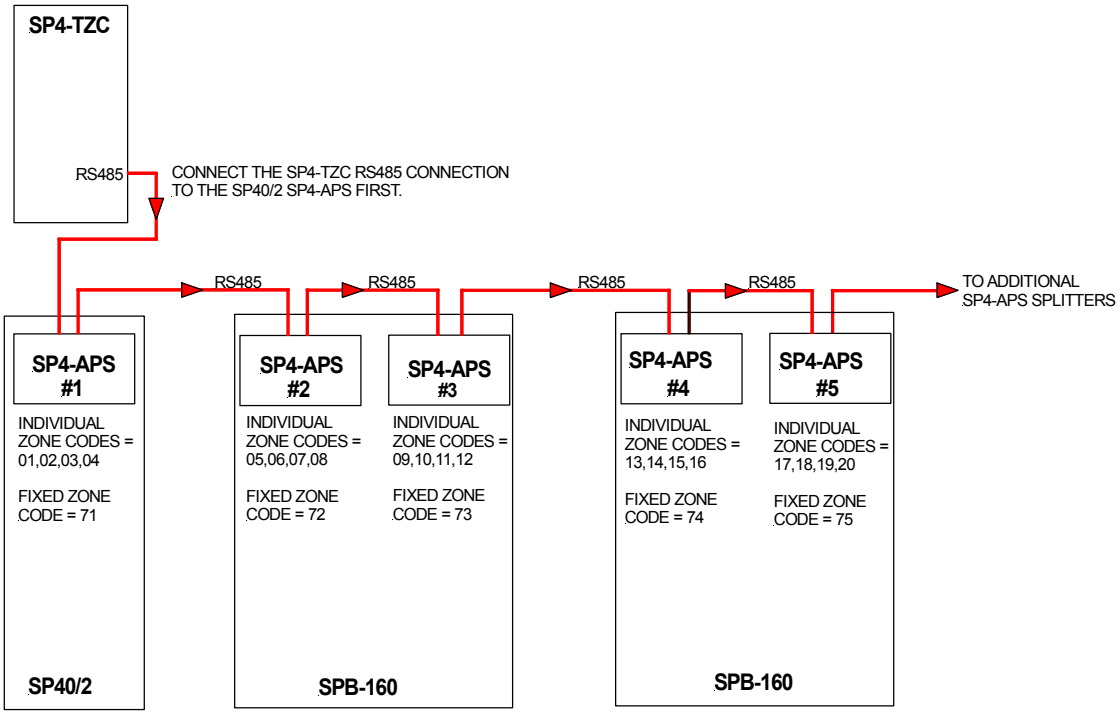


Figure 2
RS485 Communications Path from SP4-TZC to Last CLASS “B” Splitter

NOTE: Two CLASS “A” or four CLASS “B” zone codes are assigned to each splitter. If a zone audio output is not used the zone code remains with that splitter.

Appendix A, in the back of this manual, is a Telephone Page Zone Control Mapping Guide which can be used to map the zone locations and zone codes. This can assist the technician as well as the user in identifying the locations of the paging zones.

1.2 Connections

Figure 3 shows the layout of the SP4-TZC PC Board.

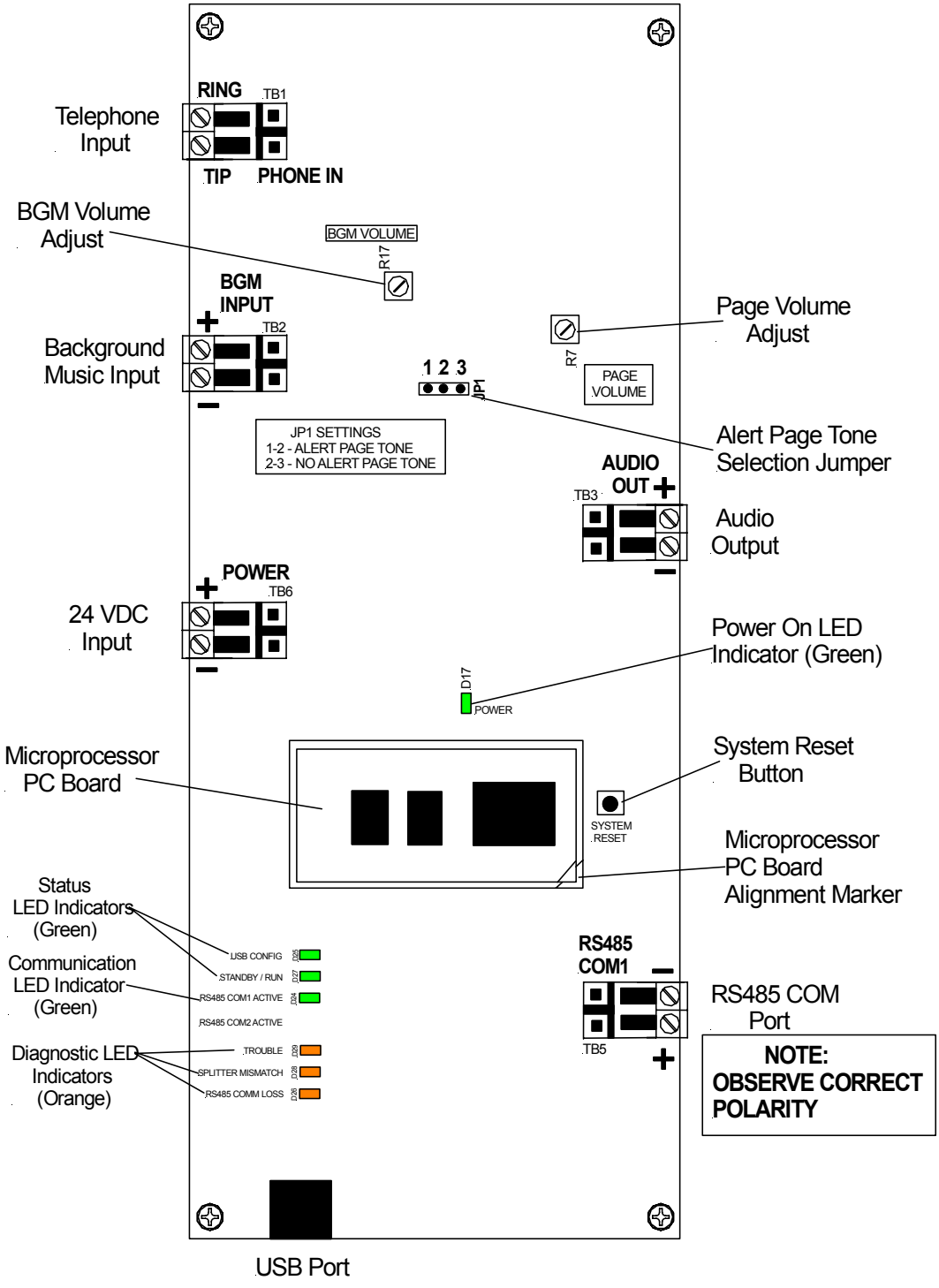


Figure 3
SP4-TZC PC Board Layout

NOTE: The Microprocessor PC Board should not be removed from the main PC board. If it has been removed, install it by using the Microprocessor PC board alignment marker shown in Figure 3. Make sure that all pins on the PC board are properly aligned.

1.2.1 Power

The SP4-TZC is powered by a separate 24VDC filtered and regulated power supply which can provide a minimum of 150mA of current. The Wheelock RPS-2406 is a good choice.

1.2.2 USB Port

The USB port is used to program the 9 Logical Zone Groups and Background Music (BGM) using the SP4 Telzone Programmer software included. The default (out of the box) configuration for the SP4-TZC is that all zones have BGM. To program using the USB port, connect an interface cable from the host computer's USB ports to the USB Series "B" receptacle located on the SP4-TZC. The USB cable should not exceed 10 feet in length. This cable can be purchased using Wheelock Part Number TZC-USB (109923). The SP4 Telzone Programmer software can also be downloaded from the Wheelock, Inc website (www.wheelockinc.com).

1.2.3 Telephone Input

The PHONE IN (Telephone Input) can accept three different types of devices to activate an audio page: a stand-alone telephone, an unused C.O. port, or a page port. The SP4-TZC provides the stand-alone telephone and unused C.O. port with loop start current in order to operate and provide DTMF tones. The page port must provide 600 Ohm impedance, provide a dry contact, pass loop current, and allow the DTMF tones to pass.

1.2.4 Background Music Input

The monaural Background Music Input shall be a Line Level Signal of 300mVrms at 600 Ohms. Background Music will be automatically muted when any other input from the SP40/2 or page input from this module is in use.

1.2.5 Audio Out

The Audio out connects the SP4-TZC to the SP40/2 BGM input.

1.2.6 RS485 Digital Control Port

The RS-485 Digital Control Port is the digital control for the SP4-APS splitters.

1.3 Enclosure

The SP4-TZC PC board is mounted in its own enclosure and is designed for indoor use only. Normally, it is mounted next to the SP40/2 enclosure. The separate 24VDC power supply is mounted outside of the enclosure.

1.4 Specifications

The SP4-TZC specifications are listed in Table 2 below.

Table 2
SP4-TZC Specifications

Specification	Value
Input Voltage	24 VDC
Maximum Current	91mA
Page Input Voltage	550mVrms
BGM Input Voltage Monaural	300mVrms at 600 Ohms
Maximum Distance between SP4-TZC and the first SP4-APS splitter using #18AWG wire.	2000 ft.

1.4.1 Wiring Specifications

Cable size: All terminal blocks accept #12 - #18 American Wire Gauge (AWG) for single wire connection.

Chapter 2 Installation Procedures

2.1 Notes, Cautions, and Warnings

NOTE: All **CAUTIONS** and **WARNINGS** are identified by the symbol ⚠. All warnings are printed in bold capital letters.

⚠**WARNING:** **PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE USING THIS PRODUCT. FAILURE TO COMPLY WITH ANY OF THE FOLLOWING INSTRUCTIONS, CAUTIONS AND WARNINGS COULD RESULT IN IMPROPER APPLICATION, INSTALLATION AND/OR OPERATION OF THESE PRODUCTS IN AN EMERGENCY SITUATION, WHICH COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

NOTE: Observe all electrical and electronic safety precautions.

This manual assumes that the SP40/2 has been installed according to the SP40/2 Installation manual (P84116) and that the SP4-APS splitter is properly installed according to the SP4-APS Installation Procedure (P84577) in the SP40/2 enclosure. It also assumes that all Audio Boosters (SPB-80/4, SPB-160, SPB-320) are properly wired according to the SPB-80/4 and SPB-160 Audio Booster Installation Manual (P84296) and/or the SPB-320 (P84244) Installation Manual, and that the SP4-APS splitters are properly installed.

⚠**WARNING:** **BEFORE INSTALLING THE SP4-TZC ZONE CONTROLLER, MAKE SURE THE POWER IS TURNED OFF AND BATTERIES REMOVED TO ALL COMPONENTS OF THE *SAFEPATH®4* MULTI-FUNCTIONAL FACILITY COMMUNICATIONS SYSTEM.**

2.2 Telephone Page Zone Control Mapping Guide

Appendix A, at the back of this manual is a Telephone Page Zone Control Mapping Guide which can be used to map the zone locations and zone codes. This can assist the technician as well as the user in identifying the locations of the paging zones. The user can create a directory from this guide.

2.3 Mounting

Perform the following steps using Figure 4 on Page 12 as a reference:

STEP 1 Remove the 4 sheet metal screws from the front cover and remove the front cover.

STEP 2 Mount the SP4-TZC to the wall next to the SP40/2 Enclosure using the two keyholes and the two circular holes provided in the base. Be sure to use mounting hardware suitable for the mounting surface.

STEP 3 Remove the 3/4" knockouts on the top and bottom of the enclosure for conduit or wire runs as desired.

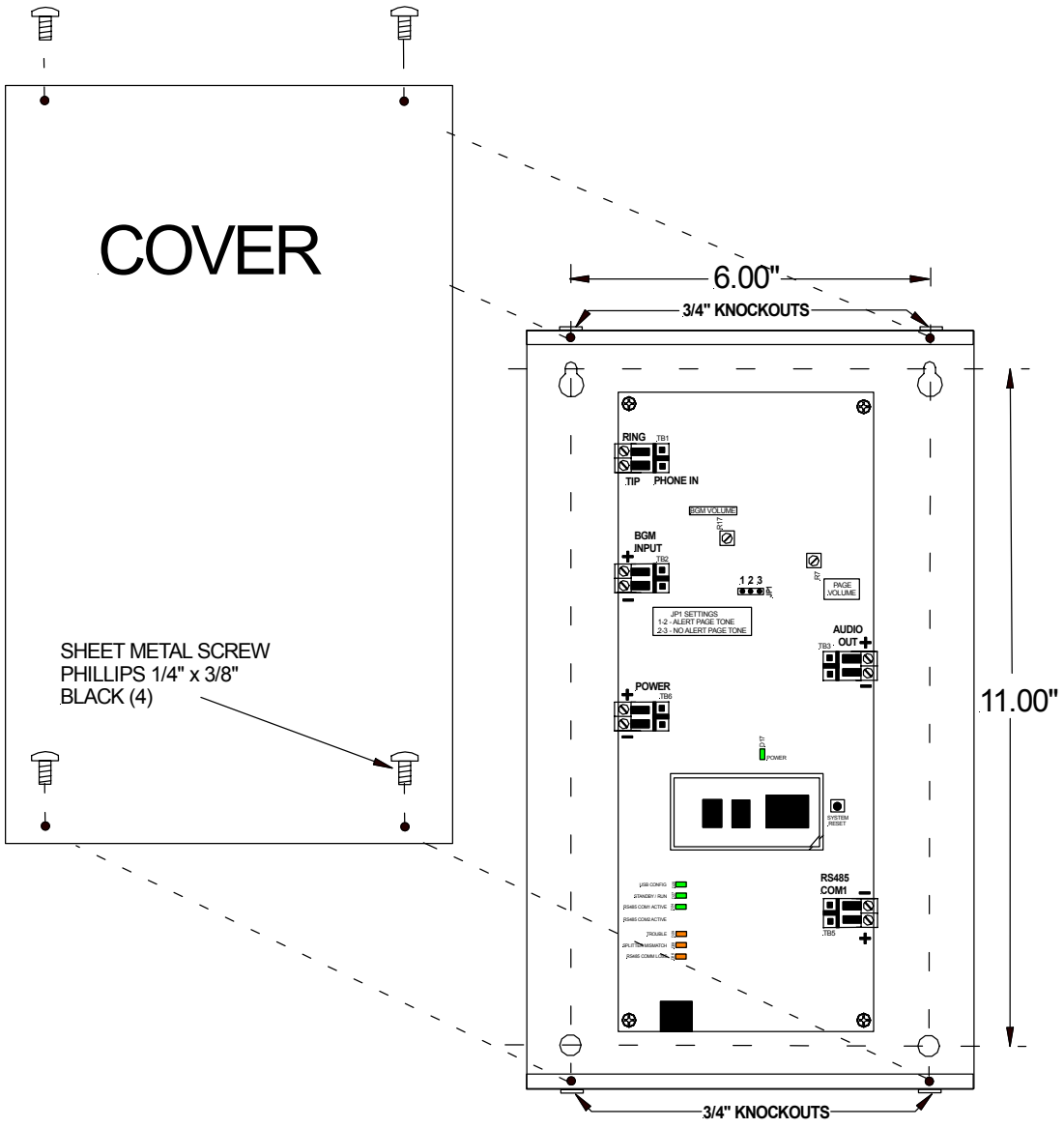


Figure 4
Mounting diagram

STEP 4 Leave the cover off until all wiring and testing has been completed.

STEP 5 Mount the external 24VDC Power Supply near the SP4-TZC. Do not connect the wiring to the SP4-TZC at this time.

2.4 Removable Terminal Block

The terminal blocks on the SP4-TZC are removable. To remove a terminal block, pull the block horizontally from the circuit board as shown in Figure 5. Attach wires to the proper connections, then plug the terminal block back on the board being careful to match and align the pins.

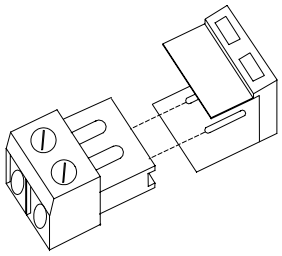


Figure 5
Removable Terminal Block

2.5 Wiring the SP4-TZC Zone Controller

This Section describes the wiring of the SP4-TZC Zone Controller. Following the sequence of Section numbers will ensure a proper installation.

STEP 6 Connect the Audio Page Port wiring to the PHONE IN terminals. See Figure 6 or 7.

2.5.1 Wiring the Paging Telephone to the SP4-TZC

2.5.1.1 Stand Alone Telephone or Unused CO Port Wiring

If a stand alone telephone or an unused CO port on a telephone system is used, wire the Tip and Ring wires directly to the **PHONE IN** terminals. The Tip wire is usually green and the Ring wire is usually red. See Figure 6 for the location of the connection on the SP4-TZC.

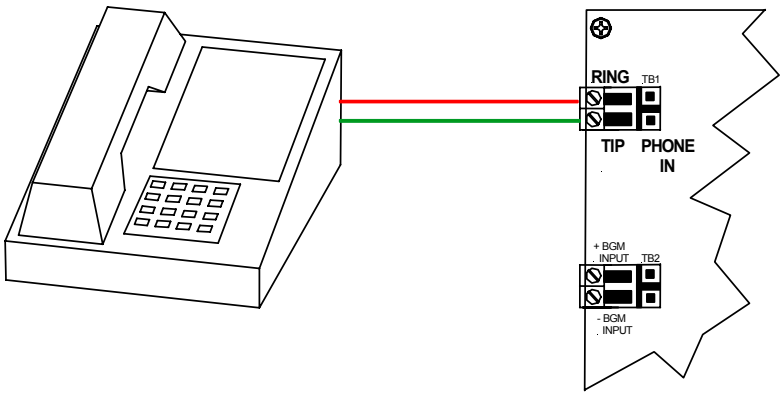


Figure 6
Stand Alone Telephone or Unused CO Port Wiring

2.5.1.2 Audio Page Port Wiring

If the SP4-TZC is to be connected to an audio page port, the audio page port must provide:

(A) A 600 Ohm, low power page output, capable of passing DC loop current.
(B) Transmission of DTMF touch tone.
(C) A dry contact that is normally open, closes when paging and reopens when the page is completed.

If these conditions are met, then connect Tip and Ring as shown in Figure 7.

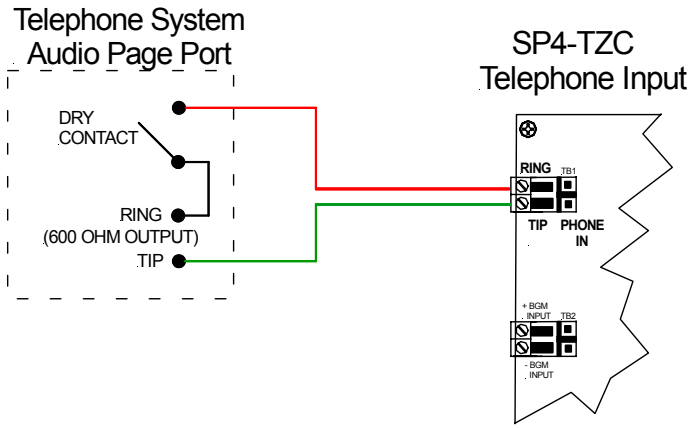


Figure 7
Connecting to a 600 Ohm Audio Page Port

2.5.2 Wiring the Background Music Input

STEP 7 Connect the Background Music source to the BGM INPUT terminals. See Figure 8.

NOTE: The Background Music Input shall be a Line Level Signal 2.5V P-P or 300mVrms at 600 Ohms signal.

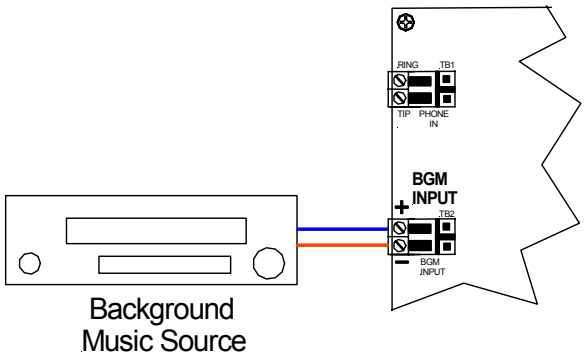


Figure 8
Connecting the Background Music

2.5.3 Connecting the AUDIO OUT Output

STEP 8 Connect the AUDIO OUT on the SP4-TZC to the BGM terminals on the SP40/2. See Figure 9.

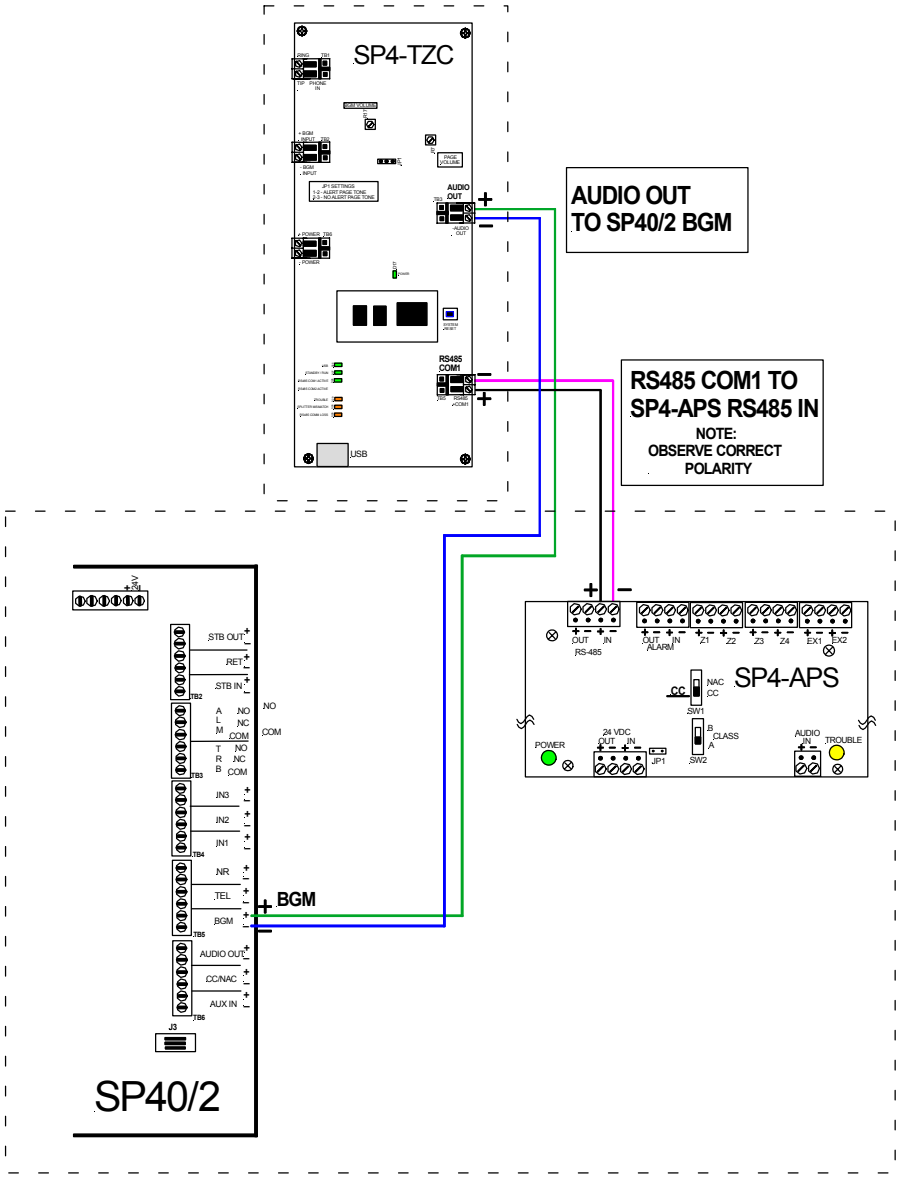


Figure 9
Audio Out and RS485 Wiring Connections

2.5.4 RS485 Digital Control Port Connection

STEP 9 Connect the RS485 Digital Control Port terminals on the SP4-TZC to the RS485 IN terminals on the SP40/2 SP4-APS splitter. See Figure 9. Observe correct polarity.

2.5.5 RS485 Digital Control Port Connection to Other SP4-APS Splitters

STEP 10 Connect the RS485 OUT on the SP40/2 SP4-APS splitter to the RS485 IN on the next SP4-APS splitter connected to an audio booster (SPB-80/4, SPB-160, SPB-320). Observe proper polarity.

NOTE: Refer to Section 1.1, Figures 1 and 2 on Pages 6 and 7. These figures show the order of the connections of the splitters.

2.6 Wiring Diagrams

2.6.1 Wiring Connections for SP4-TZC to SP40/2 and an SP4-APS

Appendix B in the back of this manual shows the typical wiring diagram to wire the SP4-TZC to the SP40/2 with one SP4-APS.

2.6.2 SP4-TZC to SP40/2 with an SP4-APS and Audio Boosters with Multiple SP4-APS Splitters

SPB-160
Appendix C in the back of this manual shows the typical wiring diagram to wire the SP4-TZC to the SP40/2 with one SP4-APS splitter and an Audio Booster with multiple SP4-APS splitters. The diagram uses an SPB-160 Audio Booster because it has two Audio Outputs with a splitter on each.

SPB-80/4
The SPB-80/4 Audio Booster has the same audio terminals except that it has a single audio output. Use Appendix C and follow the same wiring sequence as the SPB-160 wiring a single SP4-APS.

2.6.3 SP4-TZC with the SP40/2, Multiple SPB-160s and Multiple SP4-APS Splitters

Appendix D in the back of this manual shows the proper wiring of the SP4-TZC connected to an SP40/2 and two SPB-160s with multiple SP4-APS splitters.

SPB-320
Appendix D in the back of this manual also shows the proper wiring of the SP4-TZC connected to an SP40/2 and the two SPB-160s with multiple SP4-APS splitters located in the SPB-320 enclosure.

2.7 Powering, Adjusting, and Testing the SAFEPATH®4 Multi- Function Facility Communications System

When all wiring is completed it is time to apply power to the ***SAFEPATH®4*** **Multi-Function Facility Communications System** and adjust and test the SP4-TZC Zone Controller and the SP4-APS splitters.

2.7.1 Alert Page Tone Selection Jumper Setting

STEP 1 If no alert tone is desired, place the jumper on pins 2 and 3 of JP1. (Factory Default is Alert Tone, with jumper between pins 1 and 2.)

See Figure 10 for the location of the Alert Page Tone Selection Jumper.

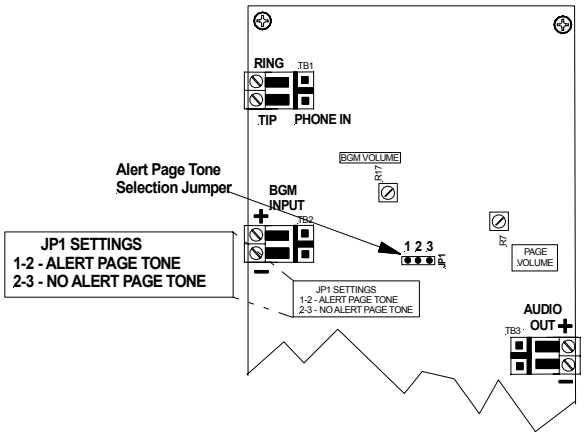


Figure 10
Alert Page Tone Selection Jumper

Note: The volume of the Alert Tone is not adjustable.

2.7.2 Power Input

NOTE: Make sure power is applied to the SP40/2 and all the Audio Boosters.

⚠**WARNING: WHEN APPLYING POWER TO THE SP40/2 AND THE AUDIO BOOSTERS, ALWAYS APPLY AC POWER BEFORE APPLYING BATTERY POWER. WHEN REMOVING POWER, REMOVE THE BATTERY POWER BEFORE REMOVING THE AC POWER.**

STEP 1 Connect the previously mounted 24VDC Power Supply to the POWER input on the SP4-TZC. Observe correct polarity. See Figure 11 on Page 18.

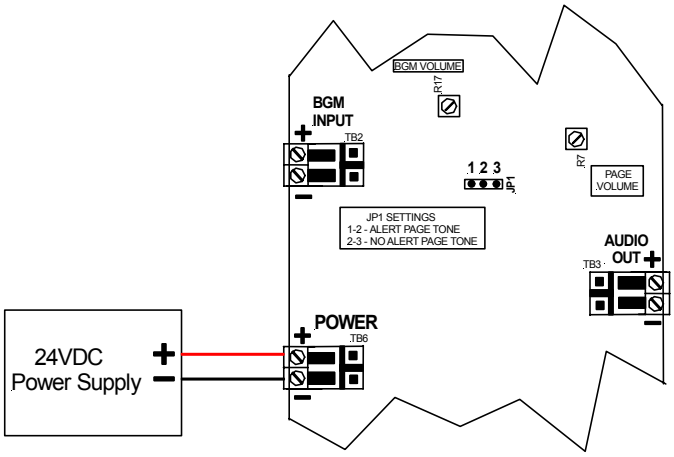


Figure 11
24VDC Connection to the SP4-TZC

STEP 2 Apply power to the 24VDC Power Supply. The "POWER" LED indicator will turn **ON**. The "RS485 COM1 ACTIVE" LED indicator should be **BLINKING**. The "STANDBY/RUN" LED will **BLINK** for a maximum of 1 minute before becoming solid **ON**. See Figure 12 for LED indicator locations.

NOTE: If an SP4-APS splitter is not energized during this process, the SP4-TZC will not "see" it and will go to the next splitter. This will affect the order of the zone codes.

NOTE: If the "TROUBLE" LED indicator is **ON**, and the "SPLITTER MISMATCH" LED indicator is **ON**, one or more of the CLASS switches on the SP4-APS splitters is in the wrong position. See Figure 12 for LED indicator locations. Check the CLASS Switch on each splitter and make sure all are in CLASS "A" or CLASS "B" as desired.

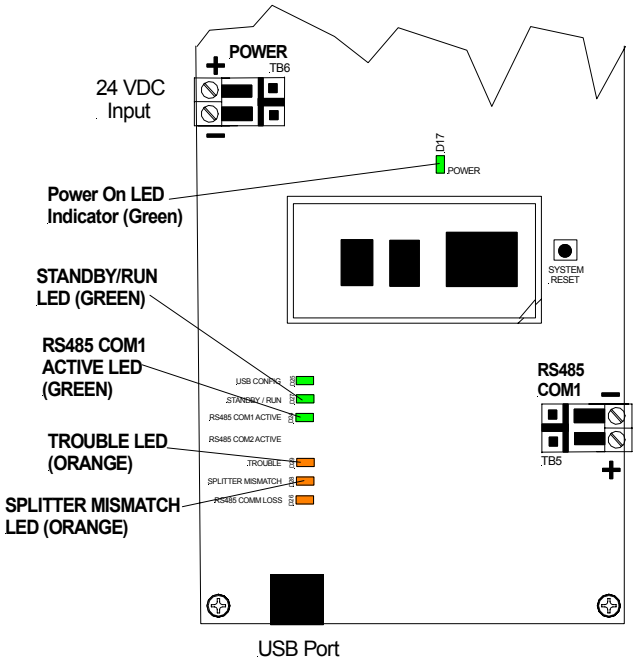


Figure 12
SP4-TZC LED Indicators

2.7.2 Adjustments on the SP4-TZC Zone Controller

The SP4-TZC has two adjustments described in Table 3. Refer to Figure 13 for locations of these volume adjustments.

Table 3
SP4-TZC Adjustments

Adjustment	Results
BGM Volume Adjust (R17)	Clockwise for Volume Increase
Page Volume Adjust (R7)	Clockwise for Volume Increase

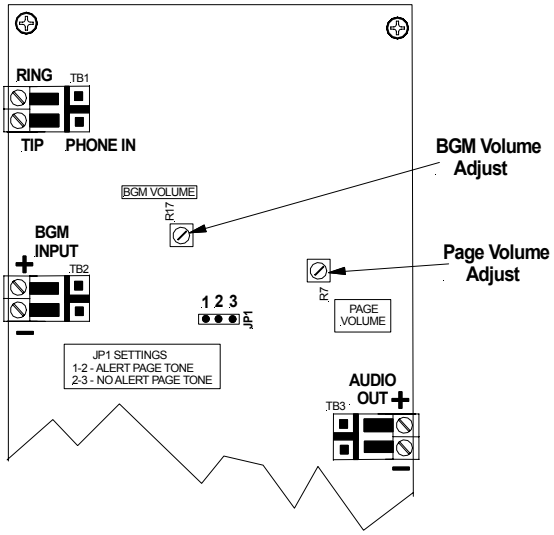


Figure 13
SP4-TZC Adjustment Locations

2.7.3 Testing the *SAFEPATH®4* Multi-Function Facility Communications System Paging Function

In the "out of the box" configuration, the paging function will only allow Individual Zones and Fixed Zone Groups to operate. Background Music will be broadcast on all Individual Zones. In order to program Logical Zone Groups and edit the Individual Zones for Background Music the SP4 Telzone Programmer software must be used. The installation and use of the SP4 Telzone Programmer software is described in Chapter 3.

STEP 1 Calculate the number of Individual Zones available. The number of Individual CLASS "B" Zones available equals the number of SP4-APS splitters times 4. The number of Individual CLASS "A" Zones equals the number of SP4-APS splitters times 2.

(CLASS "A" = 2) or (CLASS "B" = 4) X (# of SP4-APS splitters) = # of Individual Zones Available

Examples:

If I had 12 SP4-APS splitters, in order to calculate the number of CLASS "B" zones I would multiply the number of splitters by 4. The result would be 48 Individual Zones available.

In order to calculate the number of CLASS "A" zones, I would multiply the number of splitters by 2. The result would be 24 Individual Zones available.

STEP 2 Test each Individual Zone and each Fixed Zone Group as follows:

- Pick up the telephone and connect to the SP4-TZC Zone Controller.

  You will hear – Access Tone.
  Audio Output - None

- Key the 2 digit zone code for the desired Individual Zone or Fixed Zone Group.

  You will hear – Page Ready Tone
  Audio Output – Selected Zone or Zone Group will hear the alert tone if enabled as described in Section 2.7.1 on Page 17.

NOTE: If an invalid or unused 2 digit zone code is entered the operator will hear 3 short tones. There is no audio output when an invalid or unused zone code is entered.

- Make the announcement.

  Audio Output – Message will be broadcast to the selected Individual Zone or Fixed Zone Group.

NOTE: When paging, Background Music will be muted on all zones.

- At the conclusion of the page, simply hang-up the telephone handset. The Background Music will automatically be restored.

STEP 3 Replace the front cover of the SP4-TZC Zone Controller using the 4 screws to hold the cover in place. See Figure 4 on Page 12 for details.

The ***SAFEPATH®4*** **Multi-Function Facility Communications System** Paging Function is ready for operation.

Chapter 3 SP4 Telzone Programmer Software

3.1 About the SP4 Telzone Programmer Software

The SP4 Telzone Programmer software is used to program the SP4-TZC Logical Zone Groups and the Background Music (BGM) zones through the USB Port. A maximum of 9 Logical Zone groups can be programmed using the SP4 Telzone Programmer software. Each can combine up to 5 Individual Zones and/or Fixed Zone Groups.

Background Music can be programmed for each of the Individual Zones (maximum of 68). The Flash memory on the SP4-TZC stores the Logical Zone Groups and Background Music configuration. When programming has been accomplished, the SP4 Telzone Programmer software can be closed and the USB cable removed. If changes are desired, connect the USB cable from the host computer to the SP4-TZC, launch the SP4 Telzone Programmer software and make the changes.

The SP4 Telzone Programmer folder containing the files will be located on the hard drive of the computer in the "Program Files" Folder, in the folder labeled "Wheelock".

3.2 Installing the SP4 Telzone Programmer Software

The host computer operating system for the SP4 Telzone Programmer software program shall be Microsoft Windows 2000 Professional with Service Pack 2 or above, or Microsoft Windows XP Professional with Service Pack 1 and 2.

NOTE: The person installing this software must be an "Administrator" for that computer.

To install the SP4 Telzone Programmer software, proceed as follows:

STEP 1 Make certain that you close all software that is running on the host computer, and that the USB cable is not connected to the SP4-TZC.

STEP 2 Insert the SP4 Telzone Programmer software CD into the CD-ROM drive.

STEP 3 Go to "My Computer"

and double click the mouse button on the CD-ROM drive.

STEP 4 Double click on **Setup.exe**.

STEP 5 Follow the instructions on each screen. Complete the installation by pressing the FINISH button on the final screen.

At the completion of the installation process the SP4 Telzone Programmer Icon

will appear on your Desktop screen, on your **Start** menu, and in your **Programs** list.

3.3 Installing the USB Driver

After the SP4 Telzone Programmer software has been installed on the host computer, the proper USB driver must be installed. The following is the procedure:

STEP 1 Install the SP4 Telzone Programmer software CD in the CD-ROM drive on the computer.

STEP 2 Connect the USB cable between the computer and the SP4-TZC USB port.

NOTE: Use the USB Cable supplied with the Wheelock Part TZC-USB. The USB cable cannot exceed 10 feet in length. See Section 1.2.2 on Page 9 for a description of the connectors on the USB cable.

STEP 3 Power ON the SP4-TZC module by energizing the separate 24VDC power supply.

STEP 4 The "Found New Hardware" wizard indicates that new hardware has been found, and prompts the user for the location of the USB driver. Locate the USB driver on the SP4 Telzone Programmer Software CD. Follow the directions on the screen and complete the installation of the USB driver.

3.4 SP4 Telzone Programmer Main Screen

Refer to Figure 14 on Page 23 for the explanation of areas of the main screen.

3.4.1 Menu Bar

Traditional Windows style Menu Bar where you can access all the SP4 Telzone Programmer software features.

3.4.1.1 File Menu

Contains menu items and keyboard shortcuts to create a new setup using the SP4 Telzone Programmer wizard, open an existing setup file, and save changes. It also lists current SP4 Telzone Programmer setup files that are in the system.

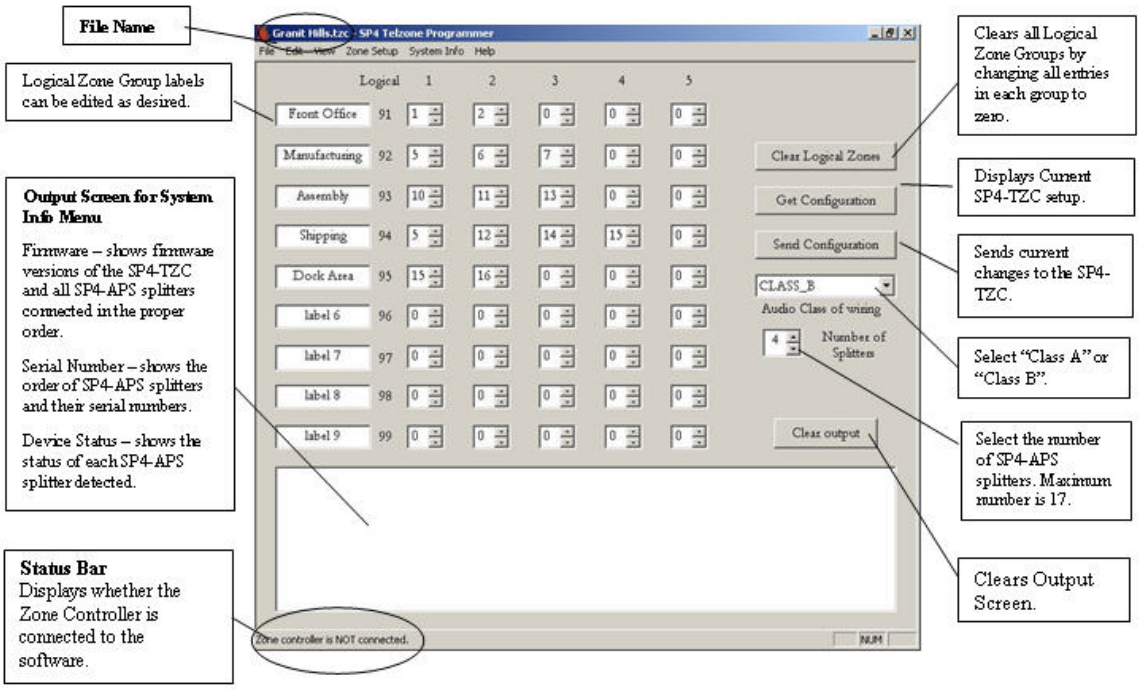
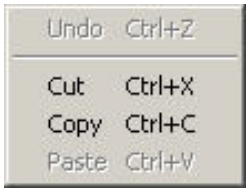


Figure 14
SP4 Telzone Programmer Main Screen

3.4.1.2 Edit Menu

Contains menu items and keyboard shortcuts used to edit the names of the Logical Zone Group labels. In the example, the Edit menu items are not bold indicating that they are unavailable. As soon as a name is entered in the Logical Zone Group label box, these menu items become available.



3.4.1.3 View Menu

Allows you to view or hide the Status Bar at the bottom of the screen.

3.4.1.4 Zone Setup Menu

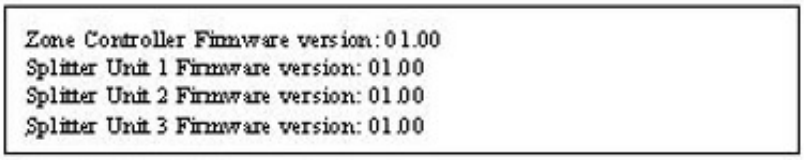
Opens the Background Music setup screen.

3.4.1.5 System Info Menu

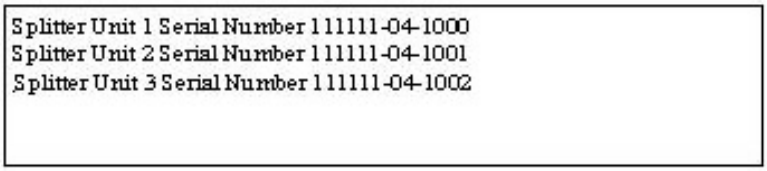
The System Info has 3 items in its menu. Each of these items are displayed on the **Output** Screen.

NOTE: To erase the Output screen, click on the **Clear Output** Command button.

The "**Firmware**" item displays the firmware version of the Zone Controller and each SP4-APS on the Output Screen. The firmware version of the Zone Controller does not have to match the splitter firmware version.

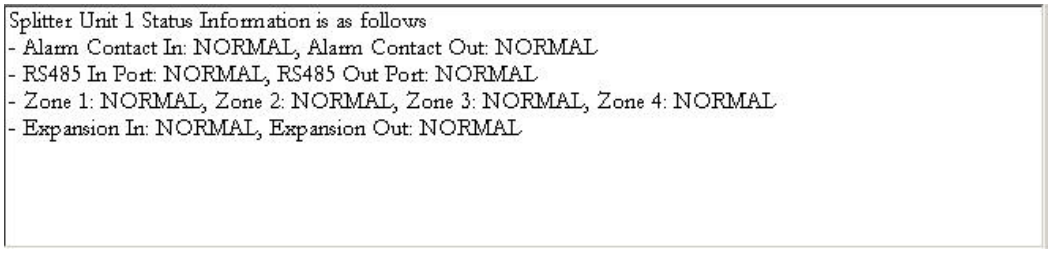


The "**Splitter Serial Numbers**" item displays the electronic serial number of each SP4-APS splitter on the Output Screen.



The order of the serial numbers does not matter for paging operation. The order that the SP4-APS splitters are placed in the circuit determines the zone code DTMF address.

The "**Splitter Status**" item displays the status for each SP4-APS splitter connected to the SP4-TZC. The following screen shows the output screen containing the splitter status for each SP4-APS splitter. This screen can be used to troubleshoot the SP4-APS splitters when a trouble conditions cannot be resolved using the LED indicators on the splitter circuit board. This command will display normal or trouble conditions for detected SP4-APS splitters. See Table 7 in Section 5.7 on Page 45.



3.4.1.6 Help Menu

Opens the **Help** screens and the "About the SP4 Telzone Programmer" display.

3.4.2 "Get Configuration" Command Button

The "Get Configuration" command button queries the SP4-TZC to obtain the current configuration. If the SP4-TZC was not previously programmed by the SP4 Telzone Programmer, the "Get Configuration" command button will query and display the current network configuration on the SP4 Telzone Programmer main screen. If the SP4-TZC was previously programmed using the SP4 Telzone Programmer, the "Get Configuration" command button will query and display the previously downloaded configuration on the SP4 Telzone Programmer main screen.

NOTE: Executing this command will overwrite the current setup on the main screen. Before clicking the "Get Configuration" command button you may choose to save the current SP4 Telzone Programmer setup by using **File**-> **Save** or **File**->**Save As…** command menu options.

3.4.3 "Send Configuration" Command Button

The "Send Configuration" command button is used to send the Logical Zone Groups and Background Music Zone configuration displayed on the SP4 Telzone Programmer screens to the SP4-TZC. When this configuration is sent it replaces all settings residing on the SP4-TZC with the new configuration.

3.5 Programming and Editing Logical Zone Groups and Background Music

The SP4 Telzone Programmer software programs the Logical Zone Groups. In review, a Logical Zone Group consists of as many as five Individual Zones and/or Fixed Zone Groups. For example, let's say you wanted to page the warehouse, the warehouse office and the loading dock using one zone code. This can be done by programming a Logical Zone Group containing these zones. Programming Logical Zone Groups can be done using the wizard feature or manually. The manual feature is also used to edit the zone groups. Let's look at the wizard feature and then the manual feature.

3.5.1 Programming the Logical Zone Groups and Background Music Using the Wizard Feature

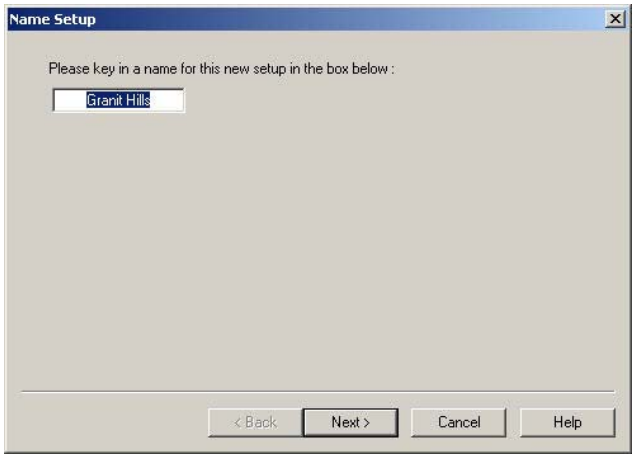
NOTE: Before creating a new Setup file, always save the current setup file.

The SP4 Telzone Programmer software contains a setup wizard for new Logical Zone Groups and Background Music file.

STEP 1 Connect the USB port on the SP4-TZC to the USB port on the host computer. Make sure that the SP40/2, all audio boosters and SP4-APS splitter modules are properly connected and powered up.

STEP 2 Start the SP4 Telzone Programmer software.

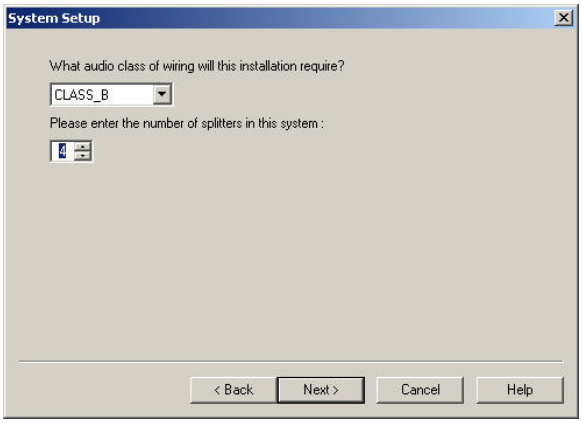
STEP 3 Run the wizard by opening the **File** menu and clicking the **New** menu option. The following screens will open:



STEP 4 Type in desired file name. (Example "Granit Hills")

NOTE: Do not choose the factory default file (**fdefault**). The program will not allow you to make any changes to it. A different name must be used.

STEP 5 Click the "**Next"** command button. The following screen will appear:

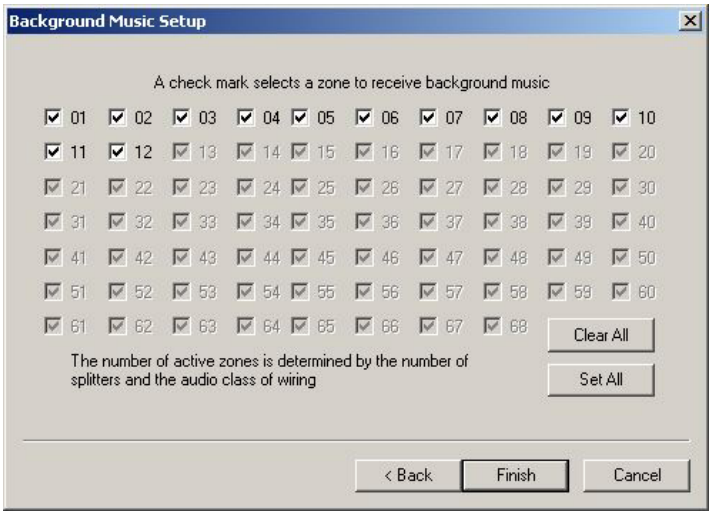


STEP 6 Enter the "**Audio Class of wiring**" for this installation (CLASS "A" or CLASS "B").

STEP 7 Enter the number of SP4-APS splitters used. (The maximum number of splitters is 17.)

NOTE: When the splitters are set to CLASS "A" the maximum number of Individual Zones is two per splitter with a maximum of 34 per system. When the splitters are set to CLASS "B" the maximum number of Individual Zones is four per splitter with a maximum number of 68 per system. Remember, all SP4-APS splitter "**Audio Class of wiring**" settings must be the same.

STEP 8 Click the **Next** command button. The **Background Music** setup screen will appear:



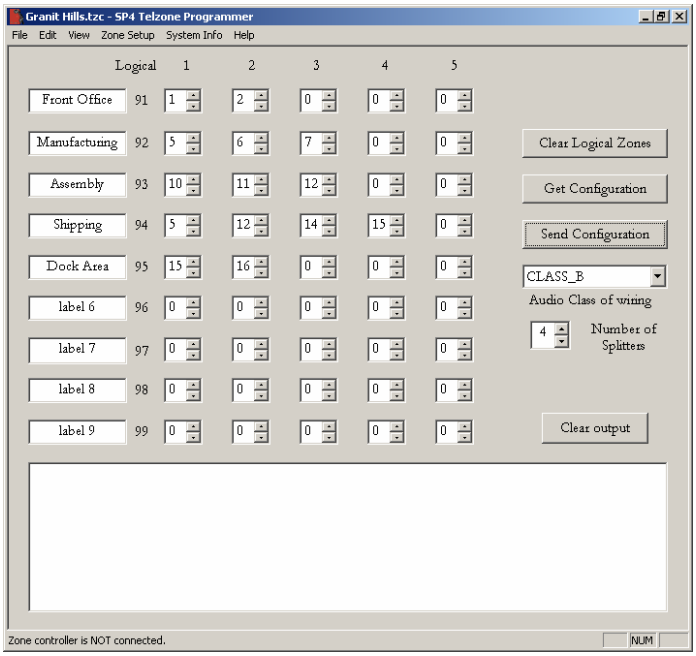
Notice that 12 of the boxes are white. This represents active zones. This would be correct when the "**Audio Class of wiring**" was set to **CLASS "B"** and the "**Number of Splitters**" was set to **3**.

NOTE: When the **Clear All** command button is selected, all check marks (✔) are removed from the zone boxes. When the Set All command button is selected, all zone boxes will contain a check mark.

STEP 9 Edit the Background Music setup to play on the desired Individual Zones. The check mark (✔) indicates that the Background Music will play on the indicated zone.

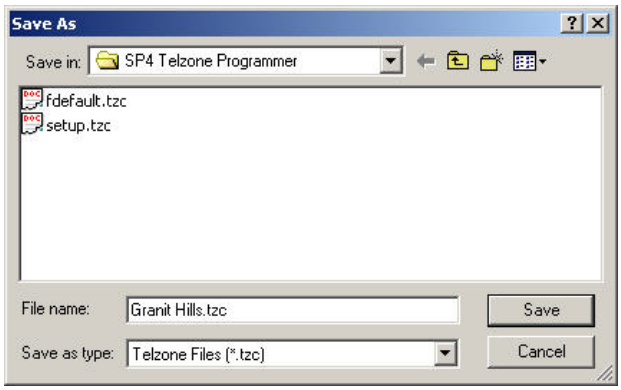
STEP 10 If Logical Zone Groups were not programmed, go to STEP 13.

STEP 11 Click the **Finish** command button. The main screen will appear.



STEP 12 Enter the name of the Logical Zone Groups and enter the zone codes for the Individual Zones and/or Fixed Zone Groups for each Logical Zone Group.

STEP 13 Save the file by opening the **File** menu and clicking **Save**. The following screen will appear:



STEP 14 Check the **File Name** and **Save**.

STEP 15 In order to configure the SP4-TZC Zone Controller and the SP4-APS splitters with the new file, click the “Send Configuration” command button. If an error message appears, refer to Section 5.6 on Page 44 for details and corrective action.

STEP 16 Close the SP4 Telzone Programmer software.

STEP 17 Disconnect the USB cable from the Zone Controller and the host computer.

3.5.2 Manually Programming Logical Zone Groups

STEP 1 Connect the USB port on the SP4-TZC to the USB port on the host computer. Make sure that the SP40/2, all audio boosters and SP4-APS splitter modules are properly connected and powered up.

3.5.2.1 Setting Up

NOTE: Before creating a new setup file, always save the current file.

STEP 2 Start the SP4 Telzone Programmer software.

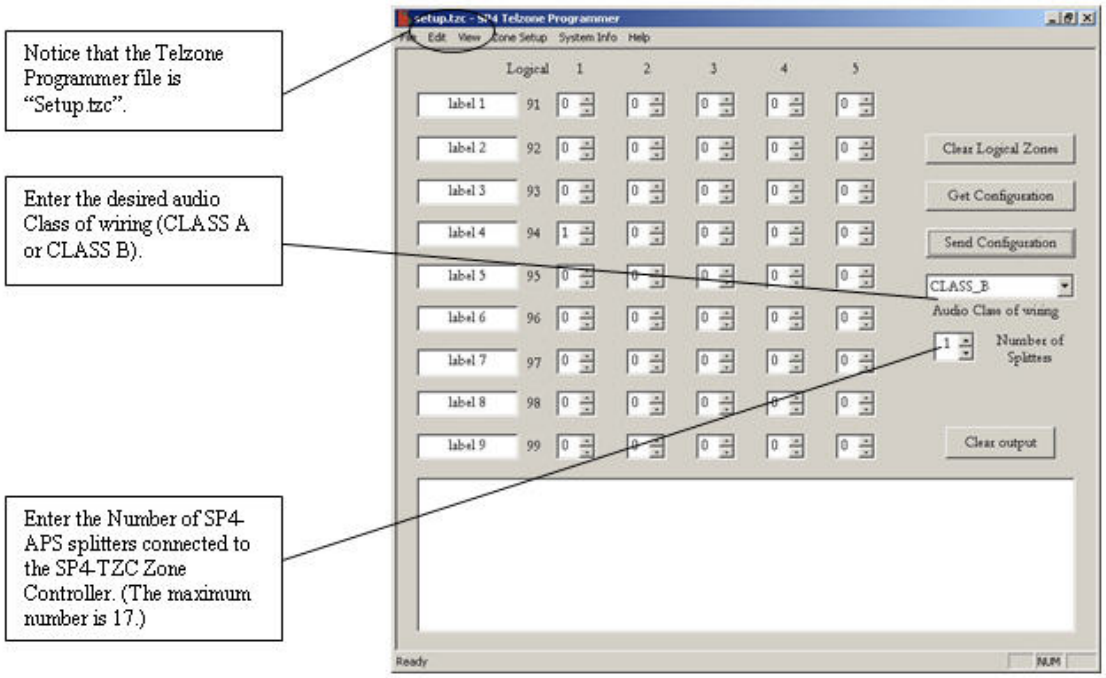
STEP 3 Notice that the **File** name is **Setup.tzc**. Do one of the following:

a. If you wish to view the present setup of the Logical Zone Groups and edit those, click the "Get Configuration" command button.

b. If you wish to select a previously programmed file, select the File Menu and click on Open. Select the desired file.

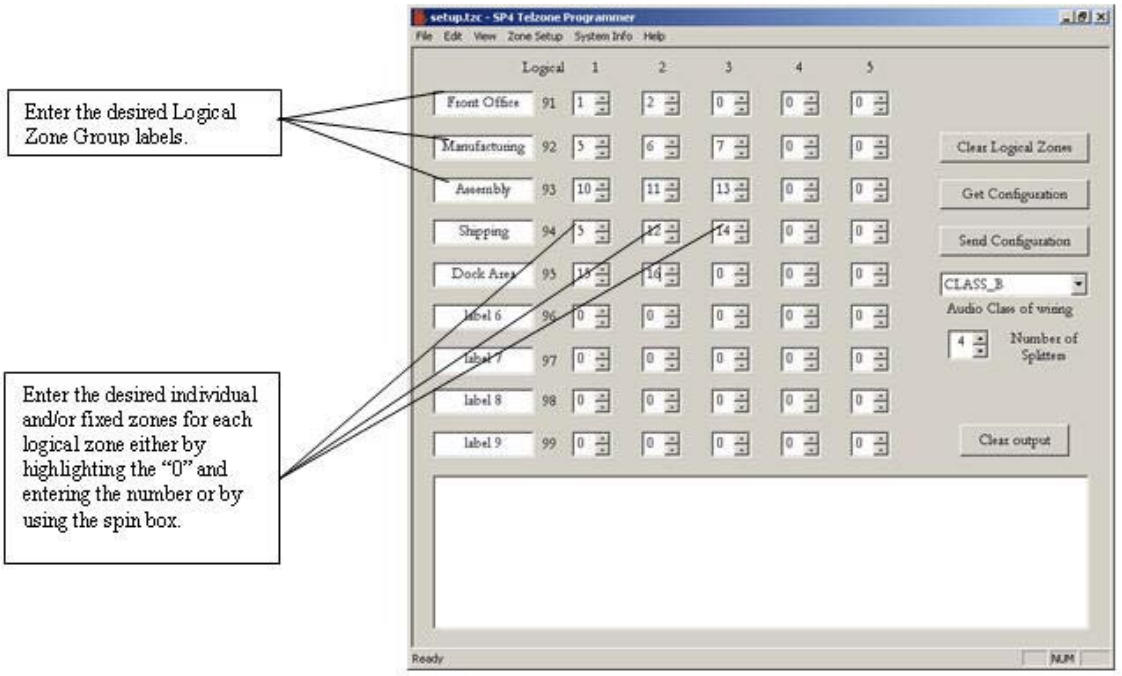
c. If you wish to create a new zone setup, select **New** from the File menu to open the Wizard and begin. Refer to section 3.5.1 on Page 25.

3.5.2.2 Programming the Logical Zone Groups Without Using the Wizard Feature



STEP 1 Select the "Audio Class of wiring" for the connected SP4-APS splitters. Remember, all splitter Class of Wiring setting must be the same.

STEP 2 Select the corresponding number of splitters in the "Number of Splitters" box. The maximum number of splitters is 17.

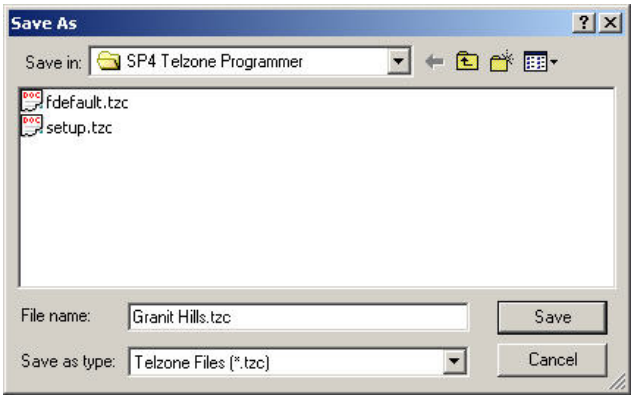


STEP 3 Program the Logical Zone Groups as desired. Remember a Logical Zone Group can consist of up to 5 Individual Zones and/or Fixed Zone Groups.

STEP 4 Label the Logical Zone Groups by highlighting the name and typing over it with the new name. An example of a label might be "Warehouse" or "Front Office".

STEP 5 When the programming of Logical Zone Groups has been completed, you may want to edit the Background Music Zone. If so, go to Section 3.6.1 on Page 33 for Background Music Zone editing.

STEP 6 If programming has been completed, open the **File** menu. Select "**Save As**…"



STEP 7 Enter the name of the file and click the **Save** command button.

STEP 8 Complete the task by clicking on the "**Send Configuration**" command button. This sends the new configuration to the SP4-TZC. Notice that the "Zone Controller Successfully Programmed" message appears on the computer screen, and that the **USB CONFIG** LED indicator on the SP4-TZC PC board turns **ON**. If an error message appears, refer to Section 5.6 on Page 44 for details and corrective action.

STEP 9 Click the "**OK**" command button on the "Zone Controller Successfully Programmed" message.

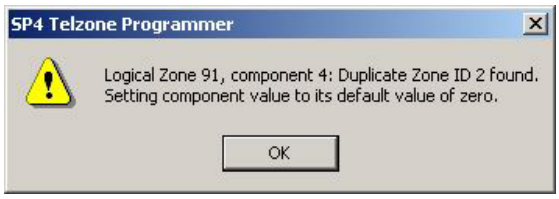
STEP 10 Shut down the SP4 Telzone Programmer software on the host computer.

STEP 11 Disconnect the USB cable from the Zone Controller and the host computer.

3.5.3 Error Message for Duplicate Zones

The following error screen will appear when a duplicate paging zone is selected in that Logical Zone Group. Remember, Individual Zones and Fixed Zone Groups can be used in more than one Logical Zone Group.

Click "**OK**". The location of the duplicate zone will be highlighted in the Logical Zone Group and the zone number will default to zero.



3.5.4 Editing Logical Zone Groups

STEP 1 Perform the setup steps in Section 3.5.2.1 on Page 29.

STEP 2 Edit the Logical Zone Group labels to the desired name.

STEP 3 Edit the zones for each Logical Zone Groups as desired. Identify the zone locations by using Appendix A Telephone Page Zone Control Mapping Guide found at the end of this guide.

STEP 4 If editing the Background Music Zone is required, go to Section 3.6.1 on Page 33.

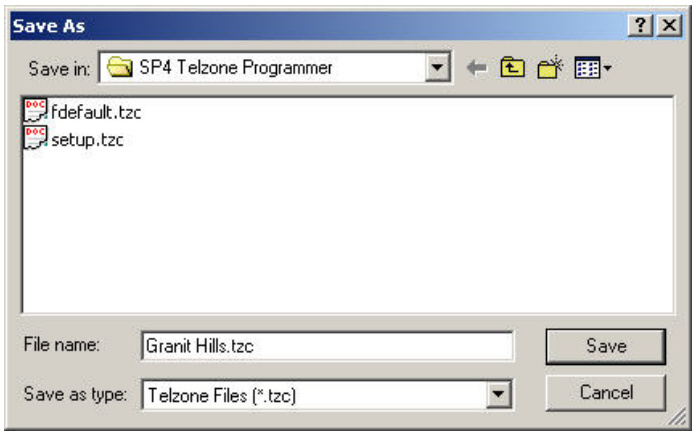
STEP 5 If editing the Background Music Zone is not desired, save the file by opening the **File** menu and "**Save**" as the current file name, or "**Save As**" with a new name. If a new name is chosen notice that the File Name is changed to the new name.

STEP 6 Complete the task by clicking on the "Send Configuration" command button. This sends the new configuration to the SP4-TZC. If an error message appears, refer to Section 5.6 on Page 44 for details and corrective action.

STEP 7 Test the Logical Zone Group changes. If they are correct, go to step 9. If errors occur, go to step 1.

STEP 8 If editing of the Background Music Zone is required, proceed to Section 3.6.1 on Page 33.

STEP 9 If editing has been completed, open the **File** menu and click the **Save** item on the menu. If a new name is required, click the "**Save As…**" item on the menu. Enter the new name and click the **Save** command button.



STEP 10 Complete the task by clicking on the "**Send Configuration**" command button. This sends the new configuration to the SP4-TZC. Notice that the "Zone Controller Successfully Programmed" message appears on the computer screen, and that the **USB CONFIG** LED indicator on the SP4-TZC PC board turns **ON**. If an error message appears, refer to Section 5.6 on Page 44 for details and corrective action.

STEP 11 Click the "**OK**" command button on the "Zone Controller Successfully Programmed" message.

STEP 12 Test the Logical Zone Groups. If they are correct, go to STEP 13. If there is an error go to Step 1 of this process.

STEP 13 Shut down the SP4 Telzone Programmer software on the host computer.

STEP 14 Disconnect the USB cable from the Zone Controller and the host computer.

3.6 SP4 Telzone Programmer Background Music Screen

The SP4 Telzone Programmer Background Music screen (Figure 15) is used to edit the zones programmed for Background Music. The active zone boxes in white are programmed from the Logical Zone Group screen when the "Number of Splitters" and the "Audio Class of wiring" are selected. A checkmark (✔) in the box indicate that zone will have Background Music. Clicking on the box toggles the checkmark on and off.

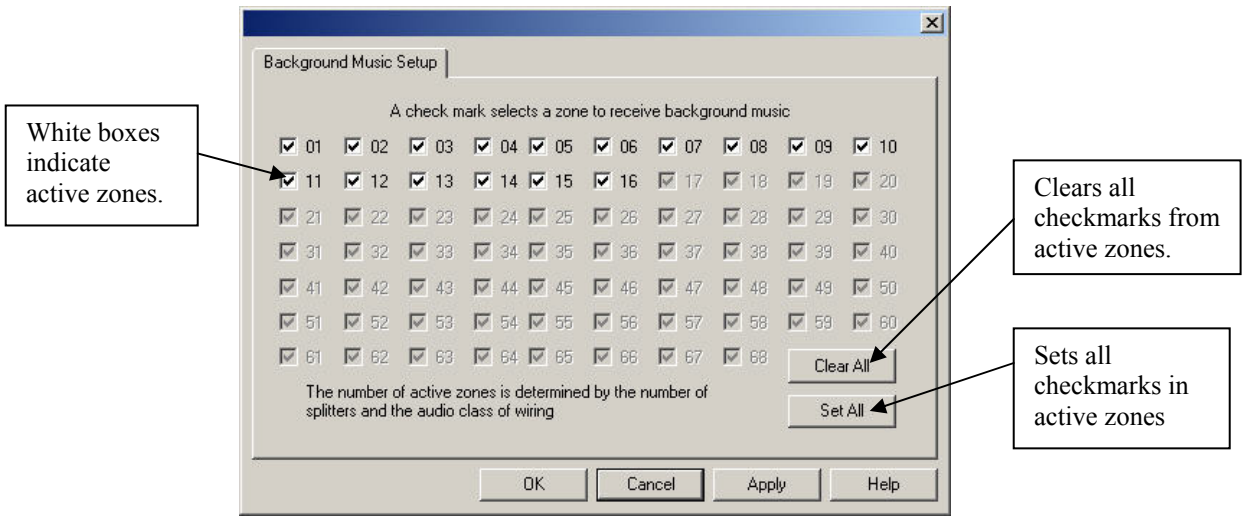


Figure 15
Background Music Screen

3.6.1 Editing Background Music

STEP 1 Connect the USB cable and perform the setup steps in Section 3.5.2.1 on Page 29.

STEP 2 Select **Background Music** from the Zone Setup menu.

STEP 3 Click the desired zones for editing to toggle the check mark (✔) ON or OFF.

NOTE: By default, all zones are selected for Background Music. If customizing of the Background Music Zone is desired, select **Background Music** from the Zone Setup menu. Clicking the zones removes the check mark, preventing the broadcasting of the Background Music on those zones. If Background Music is not desired on all zones click the "**Clear All**" command button.

STEP 4 When complete, click on the "**Apply**" command button. Click the "**OK**" command button. The Background Music setup screen will close leaving the SP4 Telzone Programmer Main Screen displayed.

STEP 5 Save the file by opening the File menu and "**Save**" as the current file name, or "**Save As…**" with a new name. If a new name is chosen notice that the **File Name** is changed to the new name.

STEP 6 Complete the task by clicking on the "**Send Configuration**" command button. This sends the new configuration to the SP4-TZC. Notice that the "Zone Controller Successfully Programmed" message appears on the computer screen, and that the **USB CONFIG** LED indicator on the SP4-TZC PC board turns **ON**. If an error message appears, refer to Section 5.6 on Page 44 for details and corrective action.

STEP 7 Click the "**OK**" command button on the "Zone Controller Successfully Programmed" message.

STEP 8 Test the Background Music Zone. If they are correct, go to STEP 9. If there is an error go to STEP 1 of this process.

STEP 9 Shut down the SP4 Telzone Programmer software on the host computer.

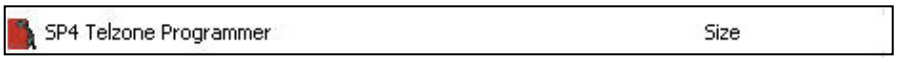
STEP 10 Disconnect the USB cable from the Zone Controller and the host computer.

3.7 Uninstalling the SP4 Telzone Programmer Software

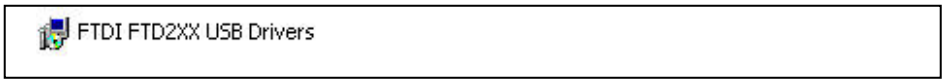
NOTE: Make sure that the SP4 Telzone Programmer software is not running on the host computer and that the USB cable has been disconnected from the SP4-TZC and the host computer.

STEP 1 On the Windows screen go to Start, Settings, Control Panel, Add/Remove Programs.

STEP 2 Remove the SP4 Telzone Programmer software.



STEP 3 Remove the USB Driver (FTDI FTD2XX).



STEP 4 This completes the un-installation process.

Chapter 4 Paging Operation

4.1 Making A General Page

The following is the procedure for making a page using the SP4-TZC Zone controller.

STEP 1 Pick up the Telephone and connect to the SP4-TZC Zone Controller.

You will hear – Access Tone.
Audio Output - None

STEP 2 Key the 2 digit zone code for the desired zone or zone group

You will hear – Page Ready Tone
Audio Output – Selected zone or Zone group – Alert Tone if selected using JP1 on the SP4-TZC. If the Alert Tone is not selected, then no output.

NOTE: If an invalid or unused 2 digit zone code is entered the operator will hear 3 short tones followed by 1 long tone. The long tone indicates that the page system has been reset allowing you to enter another zone code. There is no audio output when an invalid or unused zone code is entered.

STEP 3 Make the announcement.

Audio Output – Message will be broadcast to the select zone or zone group.

NOTE: When paging, Background Music will be muted in all zones.

STEP 4 At the conclusion of the page, simply hang-up the telephone handset. The Background Music will automatically be restored.

Intentionally Blank

Chapter 5 Troubleshooting

5.1 System Reset Button

The system reset button is located above the RS485 COM1 Port. The location is shown in Figure 16. It is used to reset the network configuration.

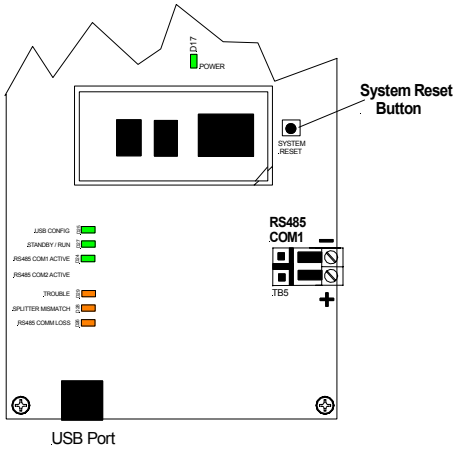


Figure 16
Reset Button Location

5.1.1 Resetting the Network Configuration (Not SP4 Telzone Programmer Programmed)

Resetting the network configuration is done when it appears that the paging system is corrupt or an SP4-APS splitter has been added, removed or replaced. Should one of these conditions occur, and the SP4-TZC has not been programmed using the SP4 Telzone Programmer software, perform this procedure. If you have made changes, use Appendix A at the end of this manual to update the new zone code location for each zone and zone group.

The procedure is as follows:

STEP 1 Remove the enclosure cover for the SP4-TZC.

STEP 2 Make sure 24VDC is **ON** to the SP4-TZC and all SP4-APS splitters.

STEP 3 Press and hold the reset button for approximately 5 seconds until the all LED indicators except the POWER LED indicator turn **OFF**.

STEP 4 Release the button. The SP4-TZC will begin finding and mapping the SP4-APS splitters. The "RS485 COM1 ACTIVE" LED indicator should be **BLINKING**. The "STANDBY/RUN" LED will **BLINK** for a maximum of 1 minute before becoming solid **ON**.

STEP 5 Install the enclosure cover.

5.1.2 Resetting the Network Configuration (SP4 Telzone Programmer Programmed)

Resetting the network configuration is done when it appears that the paging system is corrupt or an SP4-APS splitter has been added, removed or replaced. Should one of these conditions occur, and the SP4-TZC has been programmed using the SP4 Telzone Programmer software (USB CONFIG LED indicator is BLINKING), perform one of these procedures. If you have made changes, use Appendix A at the end of this manual to update the new zone code location for each zone and zone group.

If a splitter has been replaced or there appears to be corruption on the network, perform Procedure 1. If a splitter has been added or removed, perform Procedures 2.

Procedure 1: Replacing a Splitter in the Same Location or Network Corruption

STEP 1 Remove the enclosure cover for the SP4-TZC.

STEP 2 Make sure 24VDC is **ON** to the SP4-TZC and all SP4-APS splitters. Notice that the USB CONFIG LED indicator is **BLINKING**.

STEP 3 Press and hold the reset button for approximately 5 seconds until the all LED indicators except the POWER LED indicator turn **OFF**.

STEP 4 Release the button. The SP4-TZC will begin finding and mapping the SP4-APS splitters. The "RS485 COM1 ACTIVE" LED indicator should be **BLINKING**. The "STANDBY/RUN" LED indicator will **BLINK** for a maximum of 1 minute before becoming solid **ON**. The USB CONFIG LED indicator will change to solid **ON**.

STEP 5 Install the enclosure cover.

Procedure 2: Adding or Removing Splitter(s)

NOTE: If an SP4-APS splitter(s) is being added, make sure the Class of wiring switch (SW2) is in the position that matches all the other splitters.

STEP 1 Remove the enclosure cover for the SP4-TZC.

STEP 2 Make sure 24VDC is **ON** to the SP4-TZC and all SP4-APS splitters. Notice that the USB CONFIG LED indicator is **BLINKING**.

STEP 3 Press and hold the reset button for approximately 5 seconds until the all LED indicators except the POWER LED indicator turn **OFF**.

STEP 4 Release the button. The SP4-TZC will begin finding and mapping the SP4-APS splitters. The "RS485 COM1 ACTIVE" LED indicator should be **BLINKING**. The "STANDBY/RUN" LED indicator will **BLINK** for a maximum of 1 minute before becoming solid **ON**. The USB CONFIG LED indicator will be to **BLINKING**.

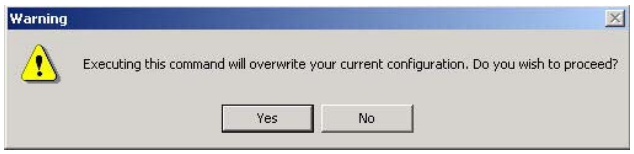
STEP 5 With the system operating, connect the USB cable between the SP4-TZC and the host computer containing the SP4 Telzone Programmer software.

STEP 6 Launch the SP4 Telzone Programmer software. The Setup file will appear on the main screen.

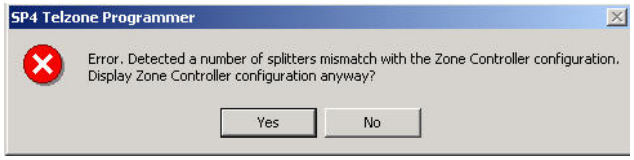
NOTE: If you want to download and edit the current SP4-TZC configuration, continue on to Step 7. (This will overwrite the SP4 Telzone Programmer Setup file.) Otherwise, go to Section 3.5 on Page 25 to create and program new Logical Zone Groups and a Background Music Zone.

STEP 7 Click the "Get Configuration" command button on the main screen.

STEP 8 Click "YES" on the Warning message. The following error message will appear:



STEP 9 Click "YES" on the Error message shown below.



STEP 10 Manually update the "Number of Splitters" box to the correct number of SP4-APS splitters on the network.

NOTE: If one or more SP4-APS splitters have been added or removed the Individual Zone codes, Fixed Zone Group codes, Logical Zone Group codes, and the Background Music Zone may change. Use Appendix A at the end of this manual to update the new zone code location for each zone and zone group.

STEP 11 Edit the Logical Zone Groups to reflect the changes made to the system, recorded in Appendix A.

STEP 12 Edit the Background Music Zone to reflect the changes made to the system, recorded in Appendix A.

STEP 13 Click the "Send Configuration" command button. Notice that the USB CONFIG LED indicator changes from **BLINKING** to solid **ON**.

STEP 14 Click "OK" on the information message shown below.

NOTE: If desired, go to the **File** menu ->**Save** and save the file as the **Setup** file, or **Save as…** and save the file with a desired name.

STEP 15 Shut down the SP4 Telzone Programmer software and remove the USB cable. If the enclosure cover has not be installed, install it now.

5.2 General Trouble Adjustments

1. The system volume of the Background Music is too loud or too soft. Adjust R17 (BGM Volume Adjust) shown on Figure 17.
2. The system volume of the page is too loud or too soft. Adjust R7 (Page Volume Adjust) shown on Figure 17.
3. The state of the alert page tone is **ON** or **OFF** and needs to be changed. Move the Alert Page Tone Selection Jumper (JP1) according to instructions found on the PC board and on Figure 17.

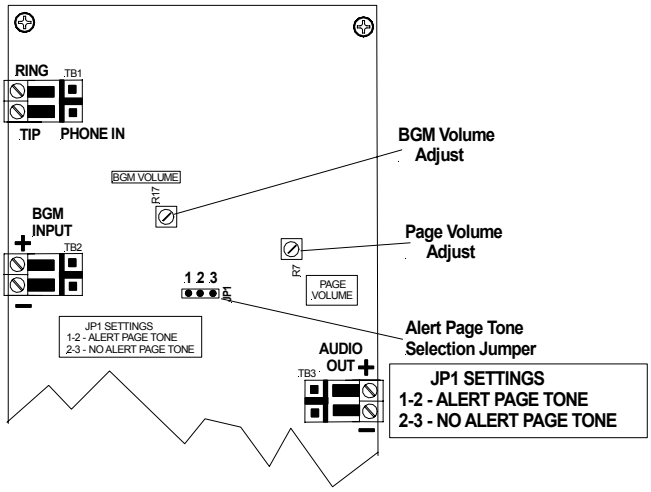


Figure 17
General Trouble Adjustment Locations

5.3 Troubleshooting Using Tone Patterns

The SP4-TZC provides audio tone patterns to help you identify a trouble or the reason a page cannot be completed. The following table describes these conditions.

Table 4
Troubleshooting Using Tone Patterns

Page Condition	Indication From SP4-TZC	Indication From SP4-APS	Indication From SP40/2
SP40/2 is in Alarm Condition. No Paging is allowed.	Busy Signal. No page.	None	None
Open Zone being paged	No Indication. Page will be broadcast on all trouble free zones.	Open LED indicator for that zone.	TROUBLE and Audio Short LED indicators.
Shorted Zone being paged	3 short beeps followed by a long beep. Page will be broadcast on all trouble free zones.	Short LED indicator for that zone.	TROUBLE and Audio Short LED indicators.
Invalid 2-digit zone code entered	3 short beeps followed by a long beep.	None	None

.

5.4 Troubleshooting Using the Trouble LED Indicators on the PC Board

The SP4-TZC PC board contains 2 status LED indicators (Green), 1 Communication LED indicator (Green), and 3 diagnostic LED indicators (Orange). Figure 18 shows the location of these LED indicators on the PC board. If a trouble condition is detected the orange TROUBLE LED indicator is "**ON**".

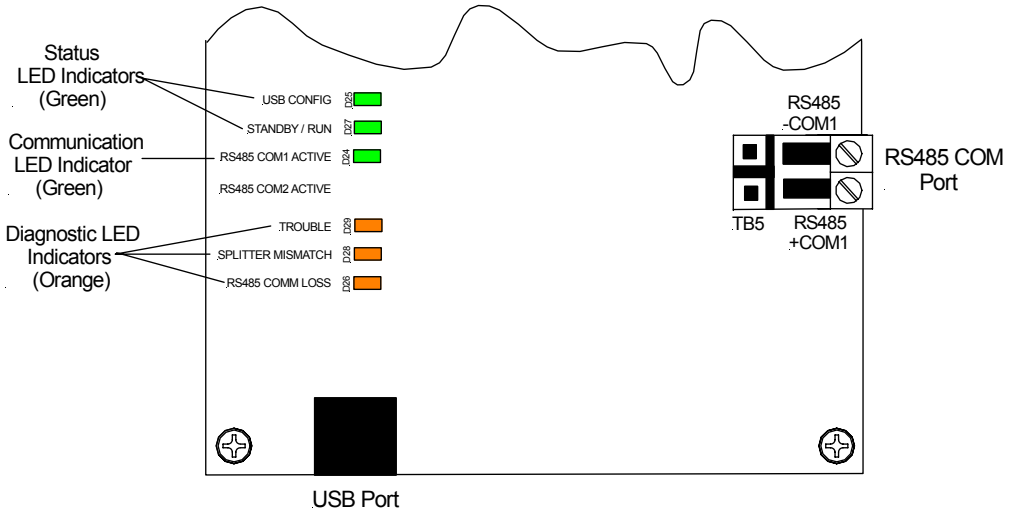


Figure 18
Location of the LED Indicators

- If the SP4-APS splitter is connected to the SP40/2, the TROUBLE and the AUDIO SHORT LED indicators on the SP40/2 will also be "**ON**".
- If the SP4-APS splitter is connected to an audio booster, the TROUBLE and the AUDIO SHORT LED indicators on the audio booster will also be "**ON**".

The following table describes the conditions of the LED indicators and if a problem is indicated, the solutions:

Table 5
Trouble LED Indicators

Trouble LED	LED Condition "ON"	Problem	Solution
ON	SPLITTER MISMATCH	LED Indicator **ON** when all SP4-APS CLASS SW2 switch are not set the same.	Check the CLASS SW2 switch on all SP4-APS splitters and set them all as CLASS "A" or CLASS "B" as applicable. Use the SP4 Telzone Programmer software on the host computer to determine which SP4-APS splitter(s) are set to the wrong "Class of wiring".
	RS485 COMM LOSS	1. RS485 Connection to an SP4-APS is inoperative. The "RS485 COMM LOSS" LED indicator will **BLINK** a pattern indicating the ordered location of the inoperative splitter connection and above. All zones beyond the inoperative connection may not be able to be paged. 2. An SP4-APS Power Loss: Green POWER LED will be **OFF** on the SP4-APS. RS485 COMM LOSS LED will **BLINK** the number of times needed to identify the ordered location of the inoperative SP4-APS splitters. All zones on the SP4-APS splitter which has lost power will pass any audio even if the SP4-TZC requests the zone to be disconnected. All other splitters will function normally.	1. Check the wiring. 2. Check 24VDC power to the SP4-APS splitter.

5.5 Troubleshooting Using the "Get Configuration" Command Button

Table 6 shows the error messages that can occur and corrective procedures when the "Get Configuration" command button is used.

Table 6
"Get Configuration" Error Messages

USB CONFIG LED	Message	Trouble Description	Corrective Procedure
Blinking	Error: No splitters were detected. Display retrieved configuration anyway? Yes or No.	After pressing the system reset button on the SP4-TZC, the SP4-TZC could not detect any SP4-APS splitters on the network.	Check the connection and polarity between the SP4-TZC RS485 COM Port and the first SP4-APS splitter. Perform the steps listed in Section 5.1.1 "Resetting the Network Configuration (SP4 Telzone Programmer Software not used)" on Page 37 or Section 5.1.2 "Resetting the Network Configuration (Using the SP4 Telzone Programmer Software " on Page 38.
	Error: Detected a number of splitters mismatch with the Zone Controller configuration. Display Zone Controller configuration anyway? Yes or No.	The SP4-TZC detected a mismatch with the number of SP4-APS splitters detected on the network.	Check RS485 connection and polarity between each SP4-APS splitter on the network. Perform the steps listed in Section 5.1.1 "Resetting the Network Configuration (SP4 Telzone Programmer Software not used)" on page 37 or Section 5.1.2 "Resetting the Network Configuration (Using the SP4 Telzone Programmer Software " on Page 38.
	Error: Detected an "Audio Class of wiring" mismatch with the Zone Controller configuration. Display Zone Controller configuration anyway? Yes or No.	The SP4-TZC detected a mismatch with the "Class of Wiring" on one or more SP4-APS splitters on the network.	Check that all SP4-APS splitters on the network have the same setting on the "Class of Wiring" switch.. Perform the steps listed in Section 5.1.1 "Resetting the Network Configuration (SP4 Telzone Programmer Software not used)" on page 37 or Section 5.1.2 "Resetting the Network Configuration (Using the SP4 Telzone Programmer Software " on Page 38.
	Error: Detected an "Audio Class of wiring" and "Number of Splitters" mismatch with the Zone Controller configuration. Display Zone Controller configuration anyway? Yes or No.	A mismatch with the "Class of Wiring" on one or more SP4-APS splitters on the network. A mismatch with the number of SP4-APS splitters detected on the network.	Check that all SP4-APS splitters on the network have the same setting on the "Class of Wiring" switch. Check RS485 connection and polarity between each SP4-APS splitter on the network. Perform the steps listed in Section 5.1.1 "Resetting the Network Configuration (SP4 Telzone Programmer Software not used)" on page 37 or Section 5.1.2 "Resetting the Network Configuration (Using the SP4 Telzone Programmer Software " on Page 38.

5.6 “Send Configuration” Error Messages

If “Audio Class of wiring” and/or “Number of Splitters” inputs are entered incorrectly one of the following error messages may appear:

5.6.1 “Audio Class of Wiring Mismatch”

If the incorrect “Audio Class of wiring” is selected the following message will appear:

Check all the SP4-APS splitters and ensure that all the CLASS switches are set the same and match the “Class of wiring” setting on the SP4 Telzone Programmer main screen.

5.6.2 “Splitters Mismatch”

If the incorrect “Number of Splitters” is entered the following message will appear:

Check to ensure that the number in the “Number of Splitters” box on the SP4 Telzone Programmer main screen matches the number of SP4-APS splitters connected to the SP4-TZC.

5.6.3 “Audio Class of Wiring and Number of Splitters Mismatch”

All SP4-APS splitters must be set to the same “Class of wiring” (CLASS “A” or “B”). If the incorrect “Audio Class of wiring” is selected and the incorrect “Number of Splitters” is entered the following message will appear:

Check all the SP4-APS splitters and ensure that all the CLASS switches are set the same and match the “Class of wiring” setting on the SP4 Telzone Programmer main screen. Check to ensure that the number in the “Number of Splitters” box on the SP4 Telzone Programmer main screen matches the number of SP4-APS splitters connected to the SP4-TZC.

5.7 Troubleshooting Using the Output Screen on the SP4 Telzone Programmer Software

Once the Logical Zone Groups and the Background Music Zone have been programmed and the configuration has been sent to the SP4-TZC using the SP4 Telzone Programmer software, the USB cable can be disconnected and the SP4 Telzone Programmer software can be shut down. Subsequent use of the software is needed when it is necessary to edit the Logical Zone Groups and customize the Background Music Zone, identify the serial numbers and ordered locations of the SP4-APS splitters, and provide status information when troubleshooting a problem with the splitters.

Table 7 lists the "**Splitter Status**" indications listed on the Output Screen. The "**Splitter Status**" command is listed under the "**System Info**" menu.

Table 7
Troubleshooting Using the Output Screen

Name	Indication	Remarks
Alarm Contact IN	NORMAL	Zone Paging can be conducted normally.
	ACTIVE	SP40/2 is in alarm condition broadcasting using the onboard microphone, remote microphone or digital voice message. Alarm Contact is shorted when NAC/CC switch is in the CC position.
	TROUBLE	Alarm Contact IN circuit is open.
Alarm Contact OUT	NORMAL	Zone Paging can be conducted normally.
	ACTIVE	SP40/2 is in alarm condition broadcasting using the onboard microphone, remote microphone or digital voice message. Alarm Contact is shorted when NAC/CC switch is in the CC position.
	TROUBLE	Alarm Contact IN circuit is shorted or open.
RS485 IN Port	NORMAL	Communication from the SP4-TZC to the splitter is being received and transmitted.
	TROUBLE	The SP4-APS splitter is not communicating with previous splitters and the zone controller. The cause can be open or shorted wiring between the RS485 IN and the previous splitter or zone controller. (The previous splitter will indicate an "RS485 OUT TROUBLE".)
RS485 OUT Port	NORMAL	Communication from the indicated splitter to the next splitter is being received and transmitted.
	TROUBLE	The SP4-APS splitter is not communicating with subsequent splitters. The cause can be open or shorted wiring between the RS485 IN and the previous splitter or zone controller. (The next splitter will indicate "RS485 IN TROUBLE".)
Zone 1 - 4	NORMAL	Audio Zone is **enabled**.
	MAJOR SHORT	Shorted wiring or Appliance on Audio Zone. Audio Zone **disabled**. See Note 1.
	MINOR SHORT	Partial short on wiring or appliance on Audio Zone. Audio **enabled**.
	OPEN	Open wiring on Audio Zone or End of Line Resistor missing. Audio Zone **enabled** to the point of the open.
Expansion IN and Expansion OUT	NORMAL	Expansion Zone IN or OUT is enabled.
	MAJOR SHORT	Shorted wiring on Audio Booster on Expansion Zone IN or OUT. Expansion Zone IN or OUT **disabled**.
	MINOR SHORT	Trouble on an Audio Booster connected to the Expansion Zone. Expansion Zone is still **enabled**.
	OPEN	Open wiring on Expansion Zone IN or OUT, or End of Line Resistor missing. Expansion Zone **enabled** to the point of the open.

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Chapter 6 Warranty

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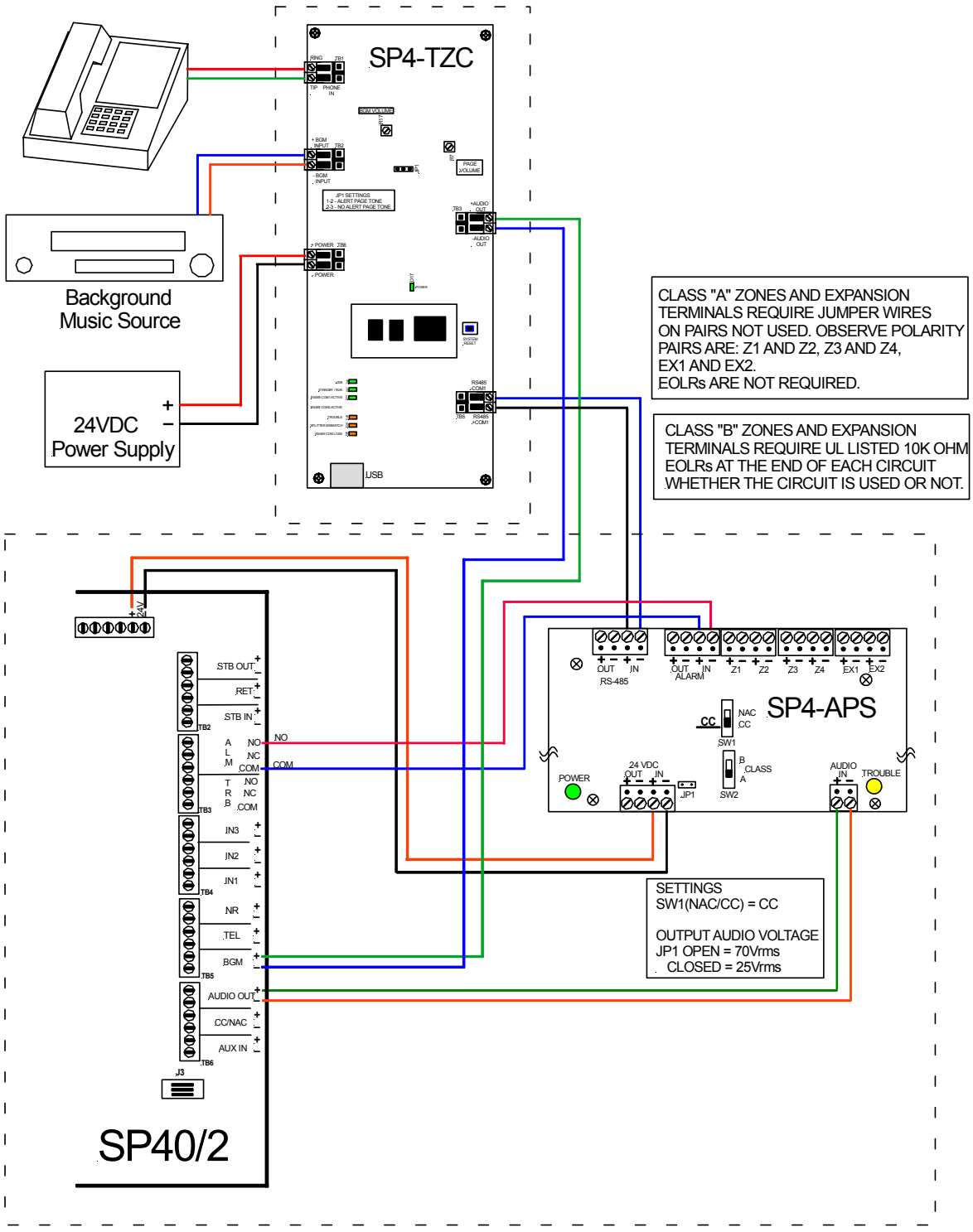
APPENDIX A
Telephone Page Zone Control Mapping Guide

Date:	**Page _____ of _____**
SP4-TZC Location:	
Zone 00 – All Call Zones 01 to 68 – Individual Zones Zones 71 to 77 – Fixed Zones Zones 91 to 99 – Logical Zones	**Number of SP4-APS Splitters:** **CLASS of Wiring:**
All Splitters must have the the same CLASS of wiring.	
CLASS A = 2 Zones per Splitter. CLASS B = 4 Zones per Splitter.	
Background Music is directed to desired areas using the Individual Zones	

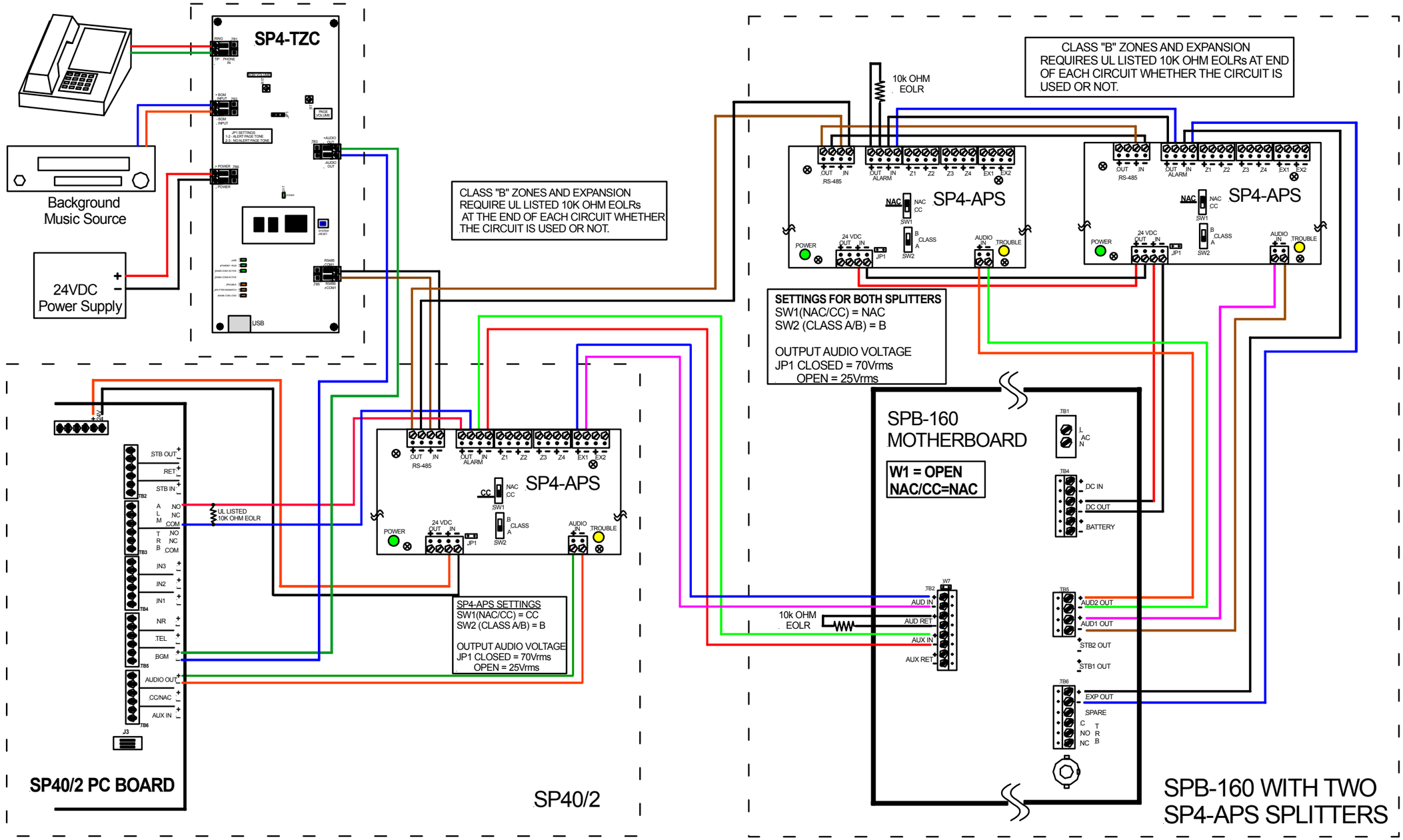
Zone Code	Page Location	BGM (Y)	Splitter Order No.	Splitter Serial No.	Location and Type of Enclosure (SP40/SPB)

Zone Code	Page Location	BGM (Y)	Splitter Order No.	Splitter Serial No.	Location and Type of Enclosure (SP40/SPB)



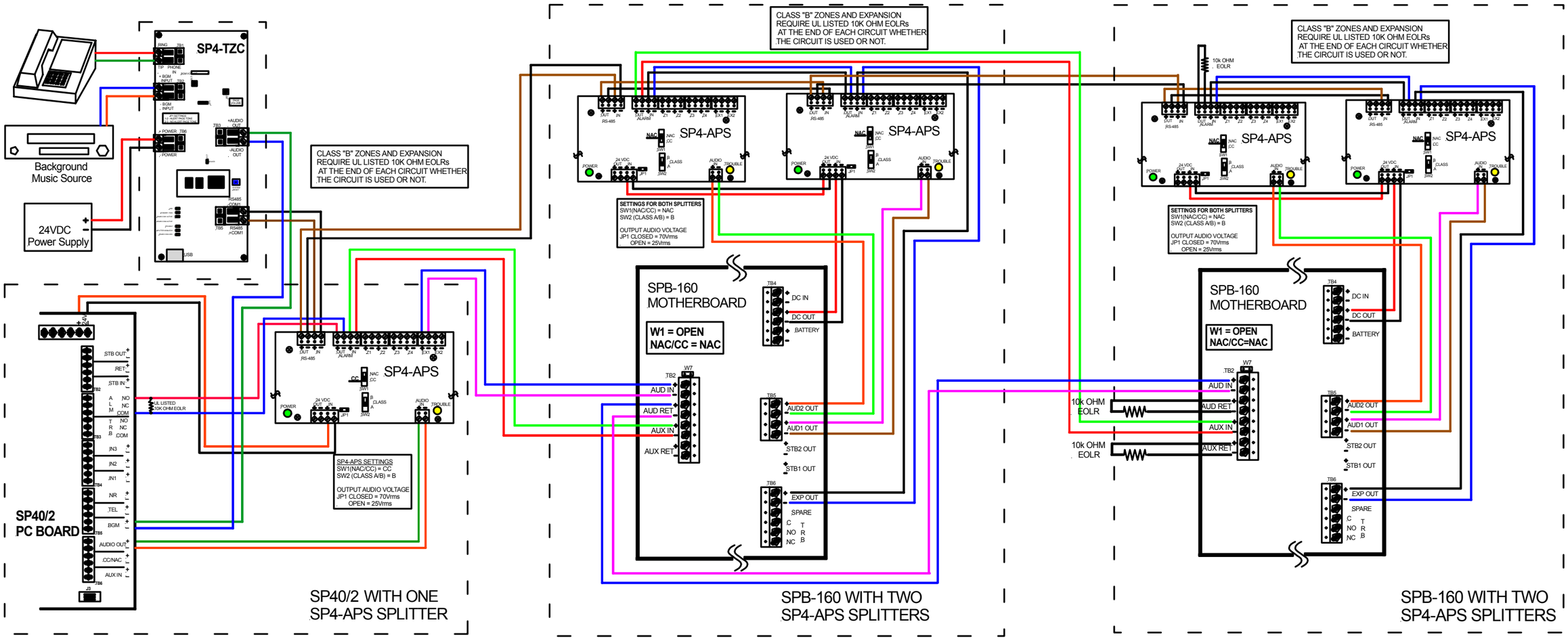
Appendix B
Wiring the SP4-TZC to the SP40/2
with One SP4-APS Splitter Module

This drawing is for illustrative purposes only.
Wire colors are for ease of reading only.



Appendix C
SP4-TZC to SP40/2 with One SP4-APS and One Audio Booster with Multiple SP4-APS Splitters

This drawing is for illustrative purposes only.
Wire colors are for ease of reading only.



Appendix D
SP4-TZC with the SP40/2, Multiple SPB-160 and/or SPB-320 and Multiple SP4-APSSplitters Wiring Diagram

This drawing is for illustration purposes only.
Wire colors are for ease of reading only.